Operation & Service Manual

Model 8311
SmartStep® Programmable Attenuator Units

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AEROFLEX WEINSCHEL

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Frederick, Maryland
2003 - 2010

SAFETY SUMMARY

DEFINITIONS.

The following definitions apply to WARNINGS, CAUTIONS, and NOTES found throughout this manual.

WARNING

An operating or maintenance procedure, practice, statement, condition, etc., which, if not strictly observed, could result in injury and/or death of personnel. Do not proceed beyond a WARNING symbol until all the indicated conditions have been fully understood and/or met.

CAUTION

An operating or maintenance procedure, practice, statement, condition, etc., which, if not strictly observed, could result in damage or destruction of the equipment or long-term health hazards to personnel. Do not proceed beyond a CAUTION symbol until all the indicated conditions have been fully understood and/or met.

NOTE

An essential operating or maintenance procedure, condition, or statement that must be highlighted.

GENERAL PRECAUTIONS.

The following are general precautions that are not related to any specific procedure and, therefore, do not appear elsewhere in this publication. These are precautions that personnel must understand and apply during various phases of instrument operation or service.

WARNING

- Potentially lethal voltages are present in this instrument. Serious shock hazards from voltages above 70 volts may exist in any connector, chassis, or circuit board. Observe the following precautions:
- To minimize shock hazard, the instrument chassis must be connected to an electrical ground. Using the supplied three-conductor power cable ensures that the instrument can be firmly connected to the ac power source and electrical ground at a grounded power outlet. If using a 3-2 wire adapter be sure to connect the ground lead to earth ground.
- Use the buddy system any time work involving active high voltage components is required. Turn OFF the power before making/breaking any electrical connection. Regard any exposed connector, terminal board, or circuit board as a possible shock hazard. DO NOT replace any component or module with power applied.
- If test conditions to live equipment are required, ground the test equipment before probing the voltage or signal to be tested.
- Personnel working with or near high voltage should be familiar with modern methods of resuscitation.
- DO NOT wear jewelry (rings, bracelets, metal watches, and/or neck chains) while working on exposed equipment. Be very cautious about using hand tools near exposed backplanes, bus bars, and/or power supply terminals. Use properly insulated tools. When making test connections to the power supply terminals and bus bars, use only insulated probe tips.
- Verify that the instrument is set to match the available line voltage and the correct fuse is installed.
- DO NOT install substitute parts or perform any unauthorized modification to this instrument. Contact Weinschel Corporation to acquire any information on replacement parts or returning the instrument for repair. Unauthorized modification can cause injury to personnel and/or destruction of the instrument.
- Operating personnel must not remove instrument covers. Component replacement or adjustments MUST BE performed by qualified service personnel.
- DO NOT operate the instrument near or in the presence of flammable gases or fumes.

DETAILED PRECAUTIONS.

The following WARNINGS, CAUTIONS and NOTES appear throughout the text of this manual and are repeated here for emphasis.

CAUTION

- All procedures and/or steps identified as must be followed exactly as written and according to industry accepted ESDS device handling procedures. Failure to comply WILL RESULT in ESDS damage.
- DO NOT use a nylon bristle brush in the solvent as the bristles may dissolve and cause damage to the circuit card or component.
- DO NOT use ultrasonic cleaning on parts or assemblies containing electrical or electronic components.
- DO NOT bend pins of electrical connectors when using fiber-bristle brush.
- Compressed air used for cleaning and/or drying can create airborne particles that may enter the eye. Goggles/faceshields should be worn. DO NOT direct air stream towards self or other personnel. Pressure should be restricted to a maximum of 15 psi to avoid personal injury.
- Under no circumstances should a wire brush, steel wool, or abrasive compound be used on any surface. Using these items will cause extensive damage to the instruments surface.

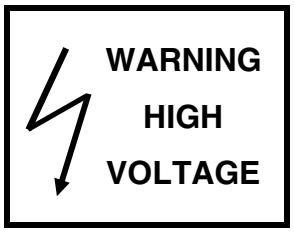
NOTE

DO NOT return any instrument or component to Weinschel Corporation without receiving prior factory authorization.

SAFETY SYMBOLS.

The following symbols are used to identify safety hazards found throughout this publication and/or located on the instrument.

CAUTION
HIGH VOLTAGE



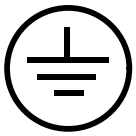


TABLE OF CONTENTS

1. GENERAL INFORMATION 5
1-1. PURPOSE 5
1-2. SCOPE 5
1-3. EQUIPMENT DESCRIPTION 5
1-4. USING THE 8311 5
1-5. UNPACKING AND INSPECTION 6
1-6. RESHIPMENT INSTRUCTIONS 6
1-7. STORAGE INSTRUCTIONS 6
1-8. RELATED MANUALS 7
1-9. ELECTROSTATIC DISCHARGE SENSITIVE (ESD) 7
1-10. ABBREVIATIONS & ACRONYMS 7
1-11. SAFETY CONSIDERATIONS 7
1-12. POWER REQUIREMENTS 7
1-13. ENVIRONMENTAL REQUIREMENTS 7

2. SPECIFICATIONS 8
2-1. GENERAL SPECIFICATIONS 8
2-2. PHYSICAL DIMENSIONS 9
2-3. CONFIGURATIONS\RF SPECIFICATIONS 9

3. INSTALLATION 10
3-1. RACKMOUNTING 10
3-2. INTIAL SETUP 10
3-3. INPUT/OUTPUT OPTIONS 10
3-3.1. POWER ENTRY MODULE ASSEMBLY 11
3-3.2. CHANNEL PORT CONNECTORS 11

4. FRONT PANEL CONTROLS & INDICATORS 12

5. REMOTE OPERATION 13
5.1. IEEE-488 INTERFACE BUS CONNECTOR 13
5-2. GPIB ADDRESS/SERIAL COMMUNICATIONS SETTINGS 13-14
5-3. IEEE-488 (GPIB) BUS OPERATION 15
5-4. SERIAL OPERATION 16
5-4.1. RS-232 OPERATION 17
5-4.2. RS-422/485 OPERATION 18
5-5. STATUS REPORTING 19-20
5-6. GENERAL SYNTAX STRUCTURE 20
5-6.1. SYNTAX OF QUERIES 20
5-6.2. SYNTAX OF COMMANDS 20-21
5-6.3. OUTPUT DATA FORMAT 21
5-6.4. NOTATIONAL CONVENTION 21
5-7. 488.2 COMMON COMMANDS 22-23
5-8. GENERAL COMMANDS 24-25

6. GENERAL CIRCUIT DESCRIPTION 26-27
6-1. POWER SUPPLY ASSEMBLY 26
6-2. STATUS DISPLAYS AND SWITCH CONTROL ASSEMBLY 26
6-3. SMARTSTEP INTERFACE ASSEMBLY 26
6-4. RF SECTION 27
7. MAINTENANCE 28
7-1. INSPECTION 28
7.2. PREVENTIVE MAINTENANCE 28
7.3. SPECIAL CLEANING INSTRUCTIONS 28
7-3.1. MICROWAVE COAXIAL CABLE ASSEMBLIES 28
7-3.2. CIRCUIT CARDS AND MODULES 28
7-3.3. MACHINED SURFACES AND HARDWARE 29
7-3.4. CHASSIS CLEANING 29
7-3.5. CONNECTOR CLEANING 29
7.4. LINE VOLTAGE FUSE REPLACEMENT 30
8. REPLACAEBLE PARTS LIST 31
8-1. UNDERSTANDING REFERENCE DESIGNATORS 31
8-2. ORDERING INFORMATION 32
8-3. DRAWING NUMBER 31
8-4. REPLACEABLE PARTS LIST 31
8-4.1. REFERENCE DESIGNATOR 31
8-4.2. DESCRIPTION 31
8-4.3. PART NUMBER 31
8-4.4. VENDOR PART NUMBER 31
8-5.5. CAGE CODE 31
8-4.6. ASSEMBLY AND COMPPONET LOCATION 31
8311-1-6-R, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7301-1) 32
8311-1-6-F, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7301-2) 33
8311-38-6-F, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7302-2) 34
8311-38-12-T, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7302-8) 35
8311-137-6-F, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7303-2) 36
8311-137-6-R, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7303-12) 37
8311-202-2-F, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7305-2) 38
8311-202-3-F, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7305-3) 39
8311-204-6-F, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7304-2) 40
8311-352-3-R, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7306-13) 41
8311-352-4-R, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7306-14) 42
8311-352-6-F, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7306-2) 43
8311-352-9-T, ATTENUATOR UNIT ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-7306-9) 44
BASIC MODEL 8311 ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-8051) 45
BASIC MODEL 8311 (+5 V) ASSEMBLY REPLACEABLE PARTS LIST (P/N 193-8051-1) 46
9. APPLICATIONS 47
10. ACCESSORIES 47
11. CONTACTING AEROFLEX / WEINSCHEL. 47

12. AEROFLEX / WEINSCHEL WARRANTY 48

13. ASSEMBLY/WIRING DIAGRAMS

8311-1-6-F, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7301-2A
8311-38-6-F, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7302-2B
8311-38-12-T, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7302-8D
8311-137-6-F, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7303-2D
8311-137-6-R, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7303-12C
8311-202-2-F, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7305-2D
8311-202-3-F, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7305-3A
8311-204-6-F, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7304-12A
8311-352-3-R, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7036-13A
8311-352-4-R, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7036-14B
8311-352-6-F, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7036-2B
8311-352-9-T, ATTENUATOR UNIT ASSEMBLY DIAGRAM 193-7306-9C
BASIC MODEL 8311 ASSEMBLY REPLACE DIAGRAM 193-8051A
BASIC MODEL 8311 (+5 V) ASSEMBLY DIAGRAM 193-8051-1A
MODEL 8311 WIRING DIAGRAM 193-8102B
MODEL 8311 WIRING DIAGRAM 193-8108A
MODEL 8311 (+5V) WIRING DIAGRAM 193-8114B
MODEL 8311 (+5V) WIRING DIAGRAM 193-8120C
MODEL 8311 WIRING DIAGRAM (193-352-9-T) 193-8129C
ICD, SPECFICATIONS 8311-1-X-X 089-3594A
ICD, SPECFICATIONS 8311-38-X-X 089-3584C
ICD, SPECFICATIONS 8311-137-6-R 089-3724B
ICD, SPECIFICATIONS 8311-137-6-X 089-3599C
ICD, SPECFICATIONS 8311-20X-X-X 089-3574C
ICD, SPECFICATIONS 8311-352-X-X 089-3868C

1. GENERAL INFORMATION:

1-1 PURPOSE: This manual contains setup and operation information for the Aeroflex / Weinschel's 8311 Series of S*martStep*® Attenuator Units. The manual also provides component location, reference designators, part numbers, and nomenclature to identify all the assemblies and sub-assemblies of the Attenuator Unit.

1-2 SCOPE: This manual is to be used in conjunction with the operation and maintenance of a 8311 Series S*martStep*™ Attenuator Unit. The manual also provides a description of each assembly; assembly parts list; block diagrams: and general maintenance procedures to maintain the instrument.

1-3 EQUIPMENT DESCRIPTION: Aeroflex / Weinschel's 8311 Series SmartStep Attenuator Units represents a new concept in programmable attenuation for bench test and subsystem applications. Standard 8311 designs house and control various Weinschel Programmable Attenuator Models (3200T, 150T, and 4200 Series) via front panel controls or standard communications interfaces including GPIB (IEEE-488) and RS-232/RS-422 /RS485. Special configurations also exists where the RF section is designed to specific customer requirements which can contain to multiple programmable attenuations used in conjunction with other coaxial devices such as switches, power combiners, directional couplers, and filters creating single or multi-channel subsystems.

1-4 USING THE 8311: The 8311 Series provides front-panel and computer control for up to 12 channels of attenuation, RF switching, or other functions. The 8311 combines the features of the Weinschel 8210A Device Controller with a front panel user interface to form a flexible, easy to use solution. Most 8311 Series are multi-channel
configurations where RF signal is routed through either the front or rear mounted channel connector to a single or multiple Weinschel programmable attenuators thus creating a channel.

For specialized configurations refer to supplemental information in the front of this manual for details. Typically Weinschel programmables are bi-directional and the RF signal can be applied to either Channel connector. Channels can be selected by selecting the front panel CHAN button. When selected, as indicated by the CHAN indicator, a new attenuation value may be entered using the INCR and DECR keys. The main display will show the current attenuation setting of the channel.

A new attenuation setting in dB may be entered using the INCR/DECR or ENTRY keys. The front panel STEP key allows the user to define the attenuation step size used by the INCR and DECR keys. Remember that the attenuation step size (resolution) is limited to the physical size of the internal attenuator cells. For example a 0-70 unit with 10 dB steps can only be adjusted in 10 dB increments but larger increments such as 20, 30, 40 dB can be set using this key. The REL key allows the user to set relative mode for attenuators.

When turned on, the currently displayed attenuation value is used as a reference value from which the attenuation may be set. In this mode, attenuation values may be positive or negative from the reference setting. When REL is turned off, the display returns to the actual attenuation setting for the channel. Refer to Section 5 for more detailed information about the front panel keys and indicators. All 8311 Series functions can also be controlled via standard communications interfaces including GPIB (IEEE-488) and RS-232/RS-422 /RS485. Refer to Section 6 for bus setup and operating instructions when using the 8311 Series in the remote mode.

1-5. UNPACKING AND INSPECTION: Upon unpacking the equipment, retain the shipping container and packing material for future shipment for recalibration. Perform the following initial inspection:

a. Carefully look at the outside of the shipping container for discoloration, stains, charring, or other signs of exposure to excessive heat, moisture, or liquid chemicals. Check for any physical damage to the shipping container such as dents, snags, rips, crushed sections or areas, or similar signs of excessive shock or careless handling.

b. With the equipment and any accessory package removed from the shipping container, check each item against the packing list or Items Supplied List. If any items are missing, contact the Weinschel, Inc. Customer Service Department.

c. Carefully inspect the equipment looking for dents, deep scratches, damaged or loose connector, or any other

d. signs of physical abuse or careless handling. If damage is found, forward an immediate request to the delivering carrier to perform an inspection and prepare a concealed-damage report. DO NOT destroy any packing material until it has been examined by an agent of the carrier. Concurrently, report the nature and extent of damage to Weinschel, Inc., giving equipment model and serial numbers, so that necessary action can be taken. Under U.S. shipping regulations, damage claims must be collected by the consignee; DO NOT return the equipment to Aeroflex / Weinschel, Inc. until a claim for damages has been established.

1-6. RESHIPMENT: Use the best packaging materials available to protect the unit during storage or reshipment. When possible, use the original packing container and cushioning material. If the original packing materials are not available, use the following procedure:

a. Wrap the storage cases in sturdy paper or plastic;

b. Place the wrapped storage cases in a strong shipping container and place a layer of shock-absorbing material (3/4 inch minimum thickness) around all sides of the unit to provide a firm cushion and to prevent movement inside the container.

c. If shipping the unit for service, attach a tag to indicate:

1. model and serial numbers
2. service required
3. description of malfunction
4. return address
5. authorization to conduct repairs
6. return authorization number

d. Thoroughly seal the shipping container and mark it FRAGILE. Ship to:

Aeroflex / Weinschel, Inc.
Attn: Customer Service Department
5305 Spectrum Drive
Frederick, MD 21703-7362
or to an authorized sales representative.

1-7. STORAGE: Storage of the Model 8311 Series *SmartStep*™ Attenuator Unit is possible for extended periods without incurring damage to internal circuitry if the 8311 Series is packaged according to the instructions above. The safe limits for storage environment are as follows:

Temperature:	67° to +167 °F (-55° to +75 °C)
Humidity:	less than 95% without condensation
Altitude:	Up to 40,000 feet

1-8. RELATED MANUALS: The following manuals contain information that may be used in conjunction with this manual to operate, service, or calibrate this instrument.

Manual	Title
H4-1 and H4-2	Federal Supply Code for Manufacturers Cataloging Handbook
IM-275	Operating & Installation Instructions for 3200T & 3201T Series ***SmartStep*** Programmable Attenuators
IM-276	Operating & Installation Instructions for 150T, 151T, 152T & 152T Series ***SmartStep*** Programmable Attenuators
IM-248	Operating & Installation Instructions for 4226 & 4228 Series ***SmartStep*** Solid-State Programmable Attenuators

1-9. ELECTROSTATIC DISCHARGE SENSITIVE: The equipment documented in this manual contains certain Electrostatic Discharge Sensitive (ESDS) components or parts. Therefore, certain procedures/steps are identified by the use of the symbol . This symbol is used in two ways:

CAUTION

All procedures and/or steps identified as must be followed exactly as written and according to accepted ESDS device handling procedures. Failure to comply **WILL RESULT** in ESDS damage.

a. When the ESDS symbol is placed between a paragraph number and title , all of that paragraph, including all subparagraphs, is considered ESDS device handling procedure.

b. When the ESDS symbol is placed between a procedure/step number and the text , all of that procedure is considered an ESDS device handling procedure.

1-10. ABBREVIATIONS AND ACRONYMS: The following list contains abbreviations used throughout this manual. Abbreviations and acronyms that are not listed conform to MIL-STD-12D.

DUT	Device Under Test
ESDS	Electrostatic Discharge Sensitive
DIB	Device Interface Bus
TBD	To Be Determined

1-11. SAFETY CONSIDERATIONS: The Attenuator Unit and all related documentation must be reviewed for familiarization with safety markings and procedures before any operation and/or service. Refer to the SAFETY SUMMARY located at the beginning of this manual for a summary of safety information and procedures. Following these simple safety precautions will ensure safe operation and service of the Attenuator Unit.

1-12. POWER REQUIREMENTS: Aeroflex / Weinschel supplies a detachable power cable (P/N 068-21) to connect an 100 to 240 Vac power source with a frequency between 50 to 60 Hz to the Attenuator Unit. To minimize shock hazard, the instrument chassis must be connected to an electrical ground. Using the supplied three-conductor power cable ensures that the instrument can be firmly connected to the ac power source and electrical ground (safety ground) at a grounded power outlet. Refer to paragraph 4-2 (Initial Setup) before applying any power to the instrument**.**

1-13. ENVIRONMENTAL REQUIREMENTS: This instrument performs best within its specifications when operated within a controlled environment having an ambient temperature of 0°± 50°C, Relative Humidity of up to 95% non condensing, and a altitude of less than 40,000 feet. Operating beyond these limits can affect the accuracy and performance of the instrument and damage internal circuitry.

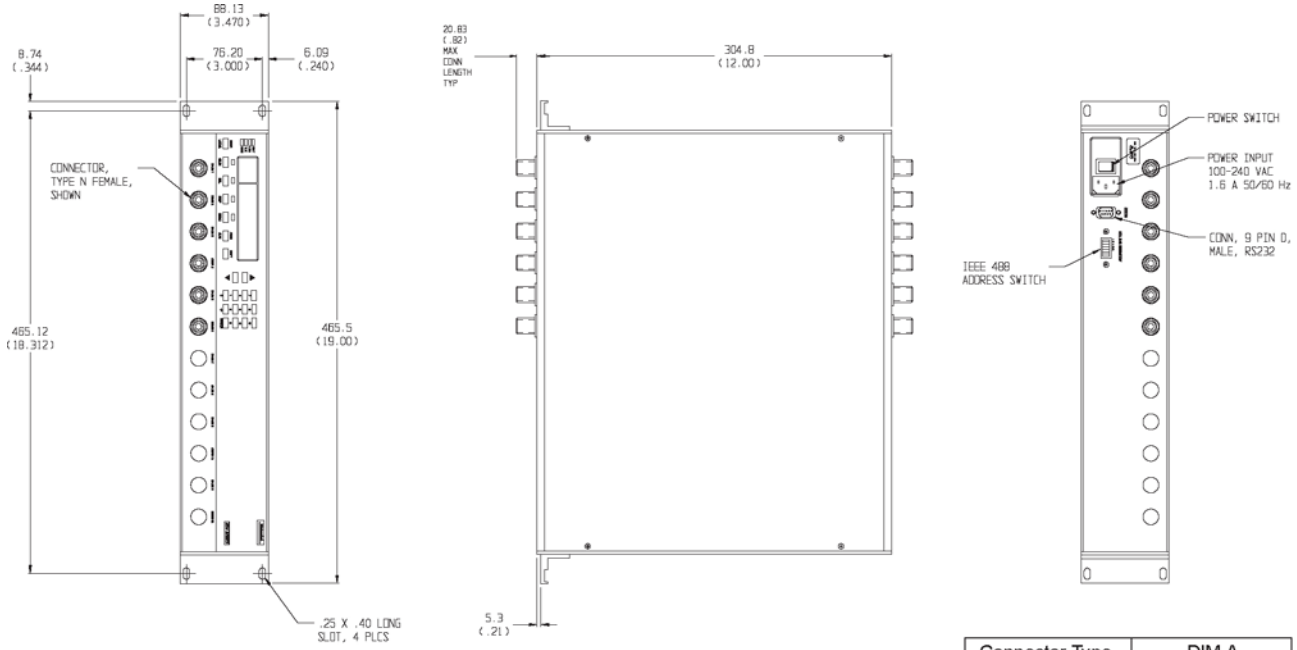
2. SPECIFICATIONS:

2-1. GENERAL SPECIFICATIONS:

Input Power Requirements	ac 100 to 240 Vac, 50/60 Hz, 50 Watts
Environmental	Operating Temperature 0 to +50°C Storage Temperature: 67° to +167 °F (-55° to +75°C) Humidity: 96% Altitude: 40,000' (12,192M)
IEEE-488 Bus(1)	Connector: 24-pin per IEEE-488.1 Protocols: per IEEE-488.2 Indicators: Remote (RMT), Listen (LSN), Talk (TLK), SRQ (SRQ)
RS-232 Bus(2)	Connector: 9-pin male D Signals: TXD, RXD, RTS, CTS, DTR, GND Baud Rates: 2400, 9600, 19200, and 38400 Data Bits: 8 Handshaking: None, RTS/CTS, XON/XOFF Parity: None, Odd, Even Indicators: Tx (Transmit) and Rx (Receive)
RS-422 Bus(3) RS-485 Bus(4)	Connector: 9-pin male D Signals: TXD+, TDX-, RXD+, RTX-, RTS+, RTS-, CTS+, CTS-, and signal GND Baud Rates: 2400, 9600, 19200, and 38400 Data Bits: 8 Handshaking: None, RTS/CTS, XON/XOFF Parity: None, Odd, Even Indicators: Tx (Transmit) and Rx (Receive)
RF Characteristics(5)	See Model Configuration Table (pg 9)

NOTES:
1. GPIB/IEEE-488 model allows user-selectable addresses.
2. RS-232 can be used with standard PC serial port for short and medium distances (up to approximately 50 ft).
3. RS-422: designed for very long distance communications (4000 ft) and & optimized as a single node protocol, typically with one device connected to a single port.
4. RS-485: designed for very long distance communications (4000 ft) & optimized for multi-drop connections that can used to create a low cost network.
5. Refer to Individual data sheet (Appendix C) for detailed specifications on internal programmable attenuators.

2-2. PHYSICAL DIMENSIONS:



Connector Type	DIM A
N	29.2 (1.15)
SMA	8.6 (0.34)
BNC	18.8 (0.74)
F	9.65 (0.38)

NOTE: All dimensions are given in mm (inches) and are maximum, unless otherwise

2-3. CONFIGURATIONS\RF SPECIFICATIONS:

Model No	Attenuator Value	Frequency Range (GHz)	Insertion Loss	SWR	No. of Channels	Attenuator Type	Connector Type	Connector Location	Drawing Number
8311-1-6-R	63/1	dc-1.0	6.00 dB max	1.6 max	6	3250T-63	BNC/F	Rear	193-7301-1
8311-1-6-F	63/1	dc-1.0	6.00 dB max	1.6 max	6	3250T-63	BNC/F	Front	193-7301-2
8311-38-6-F	63/1	dc-2.0	5.25 dB max	1.4 max	6	3206T-1	N/F	Front	193-7302-2
8311-38-12-T	63/1	dc-2.0	5.25 dB max	1.4 max	6	3206T-1	N/F	Front-Rear	193-7302-8
8311-137-6-F	63/1	dc-3.0	4.70 dB max	1.6 max	6	4226T-63	N/F	Front	193-7303-2
8311-137-6-R	63/1	dc-3.0	4.70 dB max	1.6 max	6	4226T-63	N/F	Rear	193-7303-12
8311-202-2-F	121/1	dc-18.0	5.25 dB max	1.95 max	2	150T-11, 150T-110	SMA/F	Front	193-7305-2
8311-202-3-F	121/1	dc-18.0	5.25 dB max	1.95 max	2	150T-11, 150T-110	SMA/F	Front	193-7305-3
8311-204-6-F	62/2	dc-18.0	3.25 dB max	1.95 max	6	150T-62	SMA/F	Front	193-7304-2
8311-204-6-R	62/2	dc-18.0	3.25 dB max	1.95 max	6	150T-62	SMA/F	Rear	193-7304-12
8311-352-3-R	103/1	dc-6.0	6 dB max	1.55 max	3	3408T-103	SMA/F	Front	193-7306-13
8311-352-4-R	103/1	dc-6.0	6 dB max	1.55 max	4	3408T-103	SMA/F	Front	193-7306-14
8311-352-6-F	103/1	dc-6.0	6 dB max	1.55 max	6	3408T-103	SMA/F	Front	193-7306-2
8311-352-9-T	103/1	dc-6.0	6 dB max	1.55 max	9	3408T-103	SMA/F	Front	193-7306-9

3. INSTALLATION:

3-1. RACKMOUNTING: Standard 8311 Attenuator Units are shipped with four plastic feet mounted to the bottom cover, this allows the user to place the instrument on any bench or to stack the with other Weinschel instruments. The Model 8311 can also be rack mounted as a single unit using Rack Mounting Kit (P/N 193-8033-1). This kit allows the Model 8311 to be mounted in any rack or cabinet that is designed according to EIA RS-310 or MIL-STD-189.

3-2. INITIAL SETUP: The following initial setup procedures should be performed prior to operating the 8311 Unit.

a. Perform inspection paragraph 1-5 prior to connecting the 8311 Series to any power source.

b. Check that the external power source outputs to the 8311 Series are in accordance with Section 2, Specifications.

c. Install the 8311 Series into a cabinet or rack, if desired.

d. Using the supplied power cord connect the 8311 Series to the external power source.

e. Setup the IEEE-488 bus address or RS-232/422 Communications options for your application using paragraph 4-2.6. If using the RS-422 serial configure the selectable signal pair terminations using paragraph 5-3.

3-3 INPUT/OUTPUT OPTIONS: The following paragraphs provide a description of the connections that can be made to the 8311 Series Attenuator Unit. Figure 1 shows the location of these connectors and switches.

WARNING

Sufficient power levels are present at the Power Input Assembly to cause personal injury. Ensure that the instrument power cord is DISCONNECTED before attempting to change fuses.

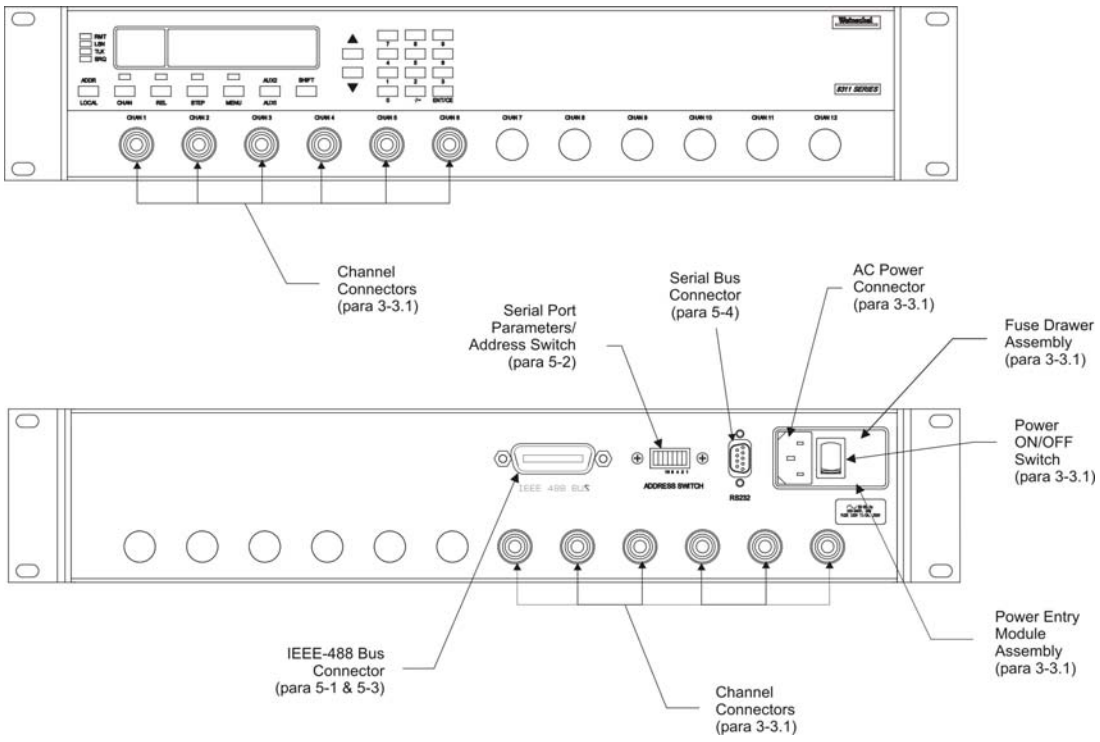

Channel Connectors (para 3-3.1)
Serial Port Parameters/ Address Switch (para 5-2)
Serial Bus Connector (para 5-4)
AC Power Connector (para 3-3.1)
Fuse Drawer Assembly (para 3-3.1)
Power ON/OFF Switch (para 3-3.1)
Power Entry Module Assembly (para 3-3.1)
IEEE-488 Bus Connector (para 5-1 & 5-3)
Channel Connectors (para 3-3.1)

Figure 1. Front & Rear Panel Connectors

3-3.1 POWER ENTRY MODULE ASSEMBLY: The Power Entry Module Assembly located on the rear panel contains a three-prong ac power input connector and a fuse drawer assembly (Figure 1). The **Fuse Drawer Assembly** contains the line voltage fuse (Weinschel P/N 052-1-1.5). The Model 8311 uses a T 1.5A, 250 Vac fuse which is 5 x 20 mm in size. Refer to paragraph 8-4.1 for replacement of the fuse.

The **AC Power Connector**, located on the left side of XF1 (Figure 1), is a plug-type, prong insert connector with three conductors for connection of the power cord (P/N 068-21) to the Power Supply Assembly located within the Attenuator Unit. This connector also grounds the chassis of the Attenuator Unit when the the ac power cord is connected to a grounded wall outlet. If necessary, use a three prong to two prong adapter and connect the adapter's ground lead to the outlet plate retaining screw.

The **Power ON/OFF Switch** is located on the rear panel and in part of the Power Entry Module Assembly. Placing the POWER ON/OFF switch in the ON position applies power to the instrument.

CAUTION

When applying an RF signal to the RF INPUT connector, DO NOT exceed the maximum allowable power level specifications of the Model 8311.

3-3.2. CHANNEL PORT CONNECTORS: A typical 8311 Series Attenuator Unit contains 12 standard D holes on the front and rear panel allowing for single or multichannel configurations. Standard Model 8311's are supplied with two PLANAR CROWN® Type N connectors that can be mounted on the front or rear panel. These connectors provide a input and output port where various types of RF signals can be applied to the devices internally mounted in the Model 8311 (Connector location specified by customer when ordering). Some special configurations could contain Aeroflex / Weinschel's Model 1568 SMA Panel Adapters or other types of crowns (see accessories for other types).

NOTE

The use of the PLANAR CROWN® connectors provide the user with easy exchange of connector types, which eliminates the need for adapters and other devices that would create additional insertion loss. This type of connector also provides quick removal and replacement of defective connectors. For more information about the PLANAR CROWN® connectors contact the Sales Department at Aeroflex / Weinschel, Inc.

4. FRONT PANEL CONTROLS & INDICATORS:

The following paragraphs provide setup and general guidelines for operating the 8311 Series ***SmartStep*** Attenuator Unit and its different bus configurations. Also provided is a general description of the internal circuitry of the 8311.

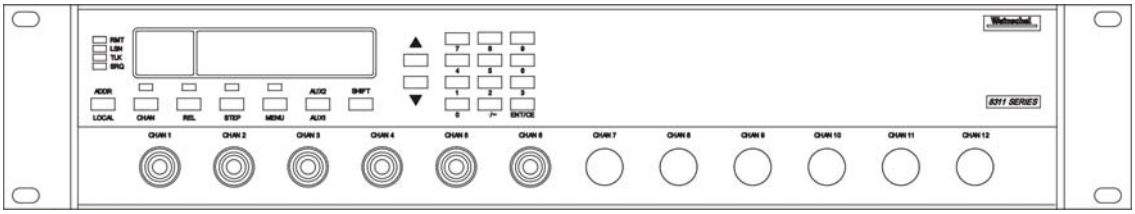


Figure 2. 8311 Series Front Panel

ENTRY keys: The numeric entry keys allow the user to directly enter numeric values. When using the keypad, values are not updated until the ENT (enter) key is pressed. The Minus (-) and CE (clear entry) functions may be accessed via first depressing the SHIFT key.

INCR & DECR : The INCR and DECR keys allow settings to be scrolled from their current value. Unlike the ENTRY keys, the new setting is updated immediately without the use of the ENT key.

CHAN: Allows the selection of the current channel, as indicated by the CH1-CH4 indicators. Repeated depressions of the CHAN key will select the next available channel. The main display will show the current setting of the channel. For configurations with 5 or more channnels, selecting the CHAN key will display the current selected channel in the main display. Channels are then selected via the INCR and DECR keys.

REL: This key control allows the use of a relative mode for attenuators, as indicated by the REL mode indicator. When turned on, the currently displayed attenuation value is used as a reference value from which the attenuation may be set. In this mode, attenuation values may be positive or negative from the reference setting. When REL is turned off, the display returns to the actual attenuation setting for the channel.

STEP: This key allows the user to change the attenuation step size used by the INCR and DECR keys. When turned on, as, indicated by the STEP indicator, the current step size is displayed in the main display, and a new value may be entered using the INCR/DECR or ENTRY keys. The step size may be set to any multiple of the intrinsic step size for the currently selected channel.

MENU: Invokes the menu functions. Menu selections may be made via the INCR and DECR keys. (NOTE: menu functions are currently not implemented as of 3/8/99)

AUX1/AUX2: The function of these keys is user-programmable via remote operation. They invoke any currently defined AUX1 and AUX2 macros. Refer to the macro programming section for information on creating macro definitions.

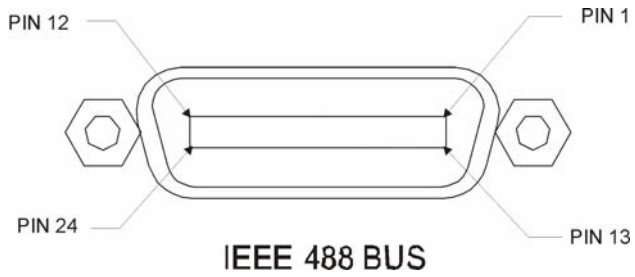
LOCAL: This key places the 8311 in local operation mode, unless the key function has been overridden via an IEEE-488.2 local lockout or execution of the LOCKOUT command.

ADDR: This key displays the current IEEE-488.2 address. The address may be changed from the front-panel, however, the initial setting at power on is derived from the rear-panel address switch.

5. REMOTE OPERATION:

The following paragraphs provide setup and general guidelines for operating the Model 8311 using an external controller.

5-1. IEEE-488 INTERFACE BUS CONNECTOR: Joining the Model 8311-1 to a system controller requires the connection of IEEE-488 control bus cable to the IEEE-488 INTERFACE BUS connector located on the rear panel. Figure 3 shows the connector's contact pin numbering scheme and lists the signal designator for signal present at each contact pin.

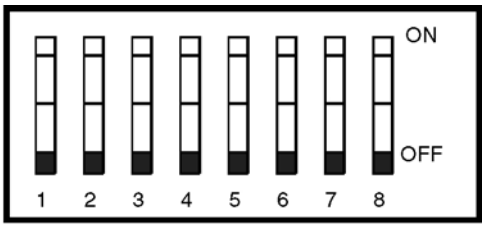


PIN No.	SIGNAL LINE	PIN No.	SIGNAL LINE
1	DIO 1	13	DIO 5
2	DIO 2	14	DIO 6
3	DIO 3	15	DIO 7
4	DIO 4	16	DIO 8
5	EOI (24)**	17	REN (24)**
6	DAV	18	GND (6)*
7	NRFD	19	GND (7)*
8	NDAC	20	GND (8)*
9	IFC	21	GND (9)*
10	SRQ	22	GND (10)*
11	ATN	23	GND (11)*
12	SHIELD	24	GND, LOGIC
* GND (N) refer to the signal ground return of the referenced pin. ** Return pin on pin 24.			

Figure 3. IEEE-488 Interface Bus Pin Locations

5-2. GPIB ADDRESS/SERIAL COMMUNICATIONS SETTINGS: The GPIB Bus Address and Serial Communications options are programmed via an internal 8 position DIP switch SW1 which is located on the rear panel. The switch is shared between the two functions, with SW1-1 controlling the selection. When SW1-1 is OFF, the remaining switches set the GPIB bus address. Likewise, when SW1-1 is ON, the switches are used to select the various serial options, including baud rate, parity, and handshaking. Refer to Figure 4 for switch location.

To configure the IEEE-488 bus address or serial communications parameters, select the appropriate switch setting using the tables located in below (Figure 4).



Note: All switches are shown in the OFF position.

GPIB	SW1	Serial	Serial Parameters
SP	1	SP	Mode Select On = Serial parameters Off = GPIB address
- - -	2	Echo	Echo Echo Enable On = Echo received data Off = No echo
- - -	3	HndshkSel	Handshaking Select On = RTS/CTS Off = XON/XOFF
A4 (16)	4	HndshkEna	Handshake Enable On = Enabled Off = Disabled
A3 (8)	5	ParitySel	Parity Select On = Odd Off = Even
A2 (4)	6	ParityEna	Parity Enable On = Enabled Off = Disabled
A1 (2) A0 (1)	7 8	BR1 BR2	BaudRate Select (see below) BaudRate Select BR1 BR0 RATE 0 0 2400 0 1 9600 1 0 19200 1 1 38400

Note: The GPIB Bus address is selectable from 0 to 30 via the rear panel dip switch. This switch is factory set to 10.

IEEE-488 Address Truth Table

Switch Number	4	5	6	7	8
Decimal Weight	16	8	4	2	1
Address:					
0	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
5	0	0	1	0	1
6	0	0	1	1	0
7	0	0	1	1	1
8	0	1	0	0	0
9	0	1	0	0	1
10	0	1	0	1	0
20	1	0	1	0	0
30	1	1	1	1	0

Figure 4. Internal Dip Switch

5-3. IEEE-488 (GPIB) Bus Operation

The internal functions of Model 8311 are controlled via an IEEE-488 bus and an external controller. The front panel LSN and RMT indicators (Figure 2) are used as status indicators for the Model 8311 *SmartStep* Interface's IEEE-488 bus operation. During bus operation a flashing LSN indicates that the Model 8311 is receiving. The RMT indicator is illuminated when the Model 8311 is in the remote state.

The table below summarizes the IEEE-488.1 interface functions that are implemented by the Model 8311.

Interface Function	Subset	Description
Source Handshake	SH1	Fully implemented
Acceptor Handshake	AH1	Fully implemented
Talker	T6	All basic Talker functions No extended addressing
Listener	L4	All basic Listener functions. No extended addressing
Service Request	SR1	Fully implemented
Remote/Local	RL1	Fully implemented
Parallel Poll	PP0	No Parallel Poll Capability
Device Clear	DC1	Fully implemented
Device Trigger	DT0	No Trigger
Controller	C0	No Controller Functions
Electrical Interface	E2	All tri-state drivers

The GPIB interface of the 8311 is IEEE-488.2 compliant. The 8311 recognizes instructions and data sent via the GPIB interface in the form of program messages comprised of ASCII characters. A program message is comprised of a sequence of program message units separated by semicolons and terminated by a line terminator (LINE END). A line terminator takes the form of an ASCII LF character (0AH), or an EOI signal asserted with the last data byte, or both. The 8311 program message units may be divided into two syntax groups: commands and queries. Refer to the section on command syntax for more information.

5-4. Serial Operation: The serial interface (RS232/RS422) provides a means of remotely programming the 8311 via external computer. The 8311 provides for user-selectable communications parameters via a DIP switch (SW1), including baud rate, data format, and handshaking method. LED indicators are provided for transmit (TX) and receive (RX) activity. Selection between RS232/RS422 mode is controlled via an internal 4 position DIP switch SW2, which also provides for user-selectable 120 ohm terminations for the RS422 receiver lines. The RS422 mode transceivers are electrically compatible with RS485.

SW2	RS232	RS422 RS485	Description
1	OFF	User Select	CTS Termination On = Termination Off = No Termination
2	OFF	User Select	RXD Termination On = Termination Off = No Termination
3	OFF	ON	RI/RTS Select
4	ON	OFF	Serial Mode On = RS232 Off = RS422

The data format includes a start bit, eight data bits, and one stop bit (N81). The Baud Rate may be set to 2400, 9600, 19200, or 34800. Parity selections include settings for None, Even, or Odd parity. Handshaking may be enabled, if desired, and the method may be set to either hardware (RTS/CTS) or software (XON/XOFF). For interactive terminal use, echoing may be enabled, in which the 8210A will echo all characters received back to the terminal.

All data and commands are encoded using the ASCII character set. The syntax for commands is the same as for GPIB operation, and uses the syntax structure defined by IEEE 488.2, with the exception of the command termination rules. Commands sent to the 8210A may be terminated with either an ASCII CR (0x0D) or ASCII LF (0x0A) character. By default, all responses from the 8210A are terminated in an ASCII CR/LF sequence (0x0D followed by 0x0A).

Software handshaking uses the XON/XOFF scheme in which an ASCII DC3 (0x13) character is transmitted by the receiver to indicate that data transmission should be halted (XOFF), and an ASCII DC1 (0x11) character is transmitted to indicate that data transmission may continue (XON). Hardware handshaking utilizes the RTS and CTS lines. When the RTS output signal is asserted true, the unit is ready for data. This signal should be connected to the external computer's CTS input signal, so that when the receiver is ready, the transmitter may send data. When the unit is not ready for data, it unasserts the RTS signal, halting data transmission. Likewise, the unit monitors the CTS input signal during data transmission, halting transmission if the external computer unasserts it's RTS signal. In addition, the 8311 unasserts the RTS signal while command execution is in progress.

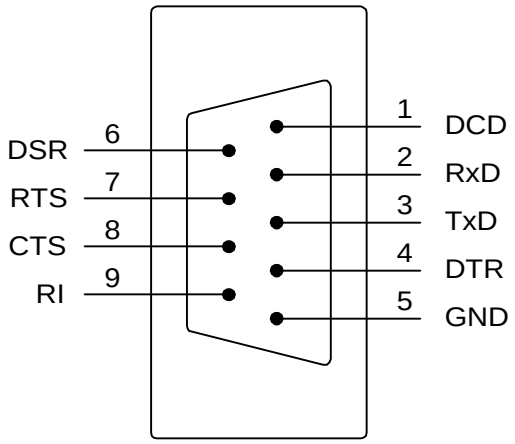
For those systems incorporating local front panel controls, the serial port can lockout local users, providing a Remote/ Local function similar to that of GPIB operation.

5-4.1. RS-232 Operation: The RS-232 Serial port is a 9-pin connector that is compatible with the pin-out of the serial port on a PC. It allows the use of a null-modem style cable. The pin-out for the connector is show below. For clarity, the signal names and directions are relative to the 8311.

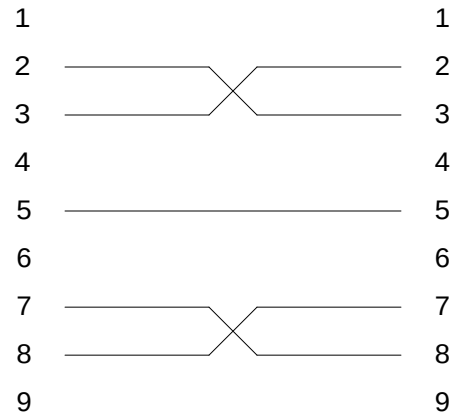
Pin	Signal Name	Description	Direction
1	DCD	unused	---
2	RxD	Receive data	input
3	TxD	Transmit data	output
4	DTR	Signals DTE is on-line	output
5	GND	Ground	---
6	DSR	unused	---
7	RTS	Signals DTE is ready	output
8	CTS	Signals DCE is ready	input
9	RI	unused	---

The DTR signal is asserted when power is on, indicating that the unit is ready.

RS232
9-pin DB9
Pinout



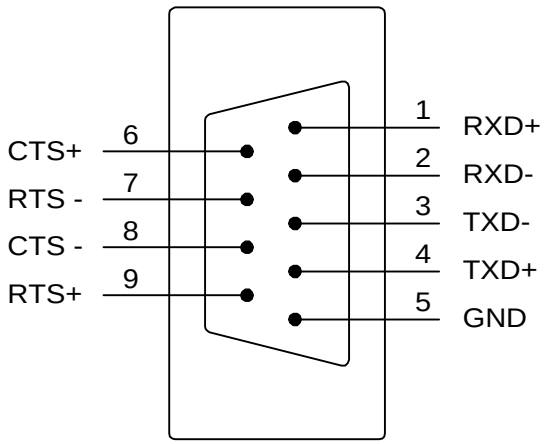
Null Modem Cable



5-4.2. RS-422/485 Operation: The RS-422/RS-485 Serial mode is useful in applications requiring long cable lengths (up to 5000 ft at 9600 baud), or in electrically noisy environments. All communication parameters available for the RS232 port are also available under RS-422 operation (baud rate, handshaking, etc). Full Duplex operation is supported. The RS-422 port utilizes a 9-pin connector. The pin-out for the connector is show below. For clarity, the signal names and directions are relative to the 8311.

Pin	Signal Name	Description	Direction
1	RxD+	Receive data	input
2	RxD-	Receive data	input
3	TxD-	Transmit data	output
4	TxD+	Transmit data	output
5	GND	Ground	---
6	CTS+	Clear To Send	input
7	RTS-	Request To Send	output
8	CTS-	Clear To Send	input
9	RTS+	Request To Send	output

RS422
9-pin DB9 Pinout



5-5. Status Reporting

The 8311A implements the 488.2 Status Reporting Structure, which utilizes the IEEE488.1 status byte with additional data structures and rules. The Status Byte Register can be read with either a serial poll (IEEE-488 operation only) or the *STB? common query command. The Service Request Enable Register (SRE) allows the user to select which bits in the Status Byte Register may cause service requests. A bit value of one indicates that the corresponding event is enabled, while a bit value of zero disables an event. The Service Request Enable Register may be accessed with the *SRE and *SRE? common commands. The Status Byte Register may be cleared with the *CLS common command, with the exception of the MAV bit, which is controlled by the operation of the Output Queue. The SRE Register is set to 0 at power-on, disabling all events.

Status Byte Register/ Service Request Enable Register Formats

D7	D6	D5	D4	D3	D2	D1	D0
	RQS	ESB	MAV		EEQ		

Bit	Mnemonic	Description
6	RQS	Request Service: This bit, if set, indicates that the device is asserting the SRQ signal.
5	ESB	Event Status Bit: This bit is true when an enabled event in the Event Status Register is true.
4	MAV	Message Available: This bit is true when there is valid data available in the output queue.
2	EEQ	Error/Event Queue: This bit is true when there is Error/Event data available in the Error/Event queue.

The Standard Event Status Register is used to report various IEEE 488.2-defined events. The register contents may be accessed with the *ESR? command. An Event Status Enable Register allows the user to select which bits in the ESR that will be reflected in the ESB summary message bit of the Status Byte Register. The Event Status Enable Register may be accessed with the *ESE and *ESE? common commands. The Event Status Register is cleared by an *ESR? query or *CLS common command. The ESE Register is set to 0 at power-on, disabling all events.

Standard Event Status Register/ Standard Event Status Enable Register Formats

D7	D6	D5	D4	D3	D2	D1	D0
ON	URQ	CME	EXE	DDE	QYE	RQC	OPC

Bit	Mnemonic	Description
7	PON	Power On: This bit indicates that the device has powered-on
6	URQ	User Request: This event bit indicates that a local control is causing a User Request
5	CME	Command Error: The parser has detected a syntax error in the current command.
4	EXE	Execution Error: The command could not be properly executed due to an illegal input range or other inconsistent data.
3	DDE	Device Dependent Error: A command could not properly complete due to some device specific error
2	QYE	Query Error: This bit indicates that either an attempt has been made to read data when there was none present, or that data in the Output Queue has been lost
1	RQC	Request Control: The device is requesting control (not implemented)
0	OPC	Operation Complete: This bit is generated in response to an *OPC command. It indicates that the ITS 2000 has completed all pending operations.

The Status Reporting Registers may be used for serial communications, with certain limitations. The Status Byte Register can only be read via the *STB? query command, as the comm port does not provide for a serial poll operation. Also, as data in the Output Queue is sent automatically during serial operation, the MAV message available bit in the STB serves no purpose.

5-6. GENERAL SYNTAX STRUCTURE: The following paragraphs outline the general syntax and command structure for the Model 8311. This structure is common to all bus flavors of the Model 8311.

NOTE

In the descriptions that follow, the term whitespace is used to define a sequence of one or more combinations of ASCII Space (20h), Carriage return (0Dh), or Tab (09h) characters.

5-6.1 SYNTAX OF QUERIES: A query message unit is made up of a query header ending in an ASCII question mark character '?' (3FH), followed by optional whitespace, and ended by a program message terminator. To form a multiple query, separate the individual program message units with a semicolon.

Examples : "ATTN?"
"ASSIGN?"

b. Multiple Query Commands:

"ATTN?; ASSIGN?"

5-6.2 SYNTAX OF COMMANDS: A command message unit is made up of a command header, optionally followed by an argument and units, and ended by a program message terminator. If multiple commands are made on the same program line, separate the individual command messages with a semicolon.

Arguments - The 8311 supports a variety of argument types that can be used in program commands. These types are:

- Character Program Data
- Integer Numeric Program Data
- Real Numeric Program Data

Each data type has its own rules of syntax. The following paragraphs provide the syntax rules for each of the argument types listed above.

Character Program Data-This data type is comprised of the set of printable ASCII characters (excluding those used as delimiters). Character program data represents alpha or alphanumeric strings. The use of alpha characters is case-insensitive. If the first character of the string is not an alpha character, then the string must be delimited with either the ASCII single-quote (') or double-quote (") character in order to distinguish the string from a numeric data type.

Examples: ATTEN1
ON
"150T"

Integer Numeric Program Data-This data type is used to represent integer, binary, or hexidecimal numeric information, all of which may be used interchangeably. Integer data is comprised of the numeric digits '0'-'9', binary data is comprised of the digits '0' and '1' preceded by the characters '#B', and hexidecimal data is comprised of the digits '0'-'9', and the letters 'A'-'F', preceded by the characters '#H' or the C language style prefix '0x'.

Examples: 123 (integer)
#H55 (hex)
0xAA (hex)
#B1010 (binary)

Real Numeric Program Data-This data type includes decimal numbers containing a sign, decimal point, and/or an exponent. The format is as follows: [sign]digits[.[digits][E[sign]digits]]

Examples: 2
2.5
-35.25E+2

In the command descriptions that follow, argument types are also described using the following additional conventions to indicate the relative size of the parameter:

byte	- used to indicate an 8-bit unsigned integer
word	- used to indicate a 16-bit unsigned integer
int8	- 8-bit integer
int16	- 16-bit integer
int32	- 32-bit integer
string	- character data, including the max number of characters allowable. (i.e., string8 has a max of 8 chars)

5-6.3 OUTPUT DATA FORMAT: Output data from the Model 8311 consists of a series of ASCII digits and message strings, terminated with an ASCII Line-Feed character (0AH), in response to a program message that contains one or more query commands. In the case of multiple query commands in the same program message, the data resulting from each of the individual message units will be separated by an ASCII comma (2CH) character.

5-6.4 NOTATIONAL CONVENTION.

[ ] Brackets indicate optional arguments or parameters.

{ } One and only one of the enclosed entries must be selected unless the field is also surrounded by brackets, in which case it is optional.

... Ellipses indicate that the preceding argument or parameter may be repeated.

[,...] The preceding item may be repeated, but each repetition must be separated by a comma.

5-8. 488.2 COMMON COMMANDS

***CLS**
Function: Clears the Status Byte and Event Status Registers.
Syntax: *CLS
Argument(s): none
Remarks: This function is used to clear the Status Byte and the Event Status Registers.
Return Value: none
Example(s): *CLS

***ESE**
Function: Sets the Event Status Enable Register.
Syntax: *ESE *mask*
Argument(s): *mask* integer bitmask
Remarks: This function is used to set the Event Status Enable Register to the value specified by mask.
Return Value: none
Example(s): *ESE 255

***ESE?**
Function: Reads the Event Status Enable Register.
Syntax: *ESE?
Argument(s): none
Remarks: This function is used to read the Event Status Enable Register.
Return Value: *mask* integer register mask
Example(s): *ESE? returns the following '255'

***ESR?**
Function: Reads the Event Status Register
Syntax: *ESR?
Argument(s): none
Remarks: This function is used to read the Event Status Register. Reading the register clears it.
Return Value: *reg* integer register
Example(s): *ESR? returns the following '128'

***SRE**
Function: Sets the Status Byte Enable Register
Syntax: *SRE *mask*
Argument(s): *mask* integer bitmask
Remarks: This function is used to set the Status Byte Enable Register to the value specified by *mask*.
Return Value: none
Example(s): *SRE 255

***SRE?**
Function: Reads the Status Byte Enable Register.
Syntax: *SRE?
Argument(s): none
Remarks: This function is used to read the Status Byte Enable Register.
Return Value: *mask* integer register mask
Example(s): *SRE? returns the following '255'

***STB?**
Function: Reads the Status Byte Register.
Syntax: *STB?
Argument(s): none
Remarks: This function is used to read the Status Byte Register.
Return Value: *reg* integer register
Example(s): *STB? returns the following '96'

***IDN?**
Function: Reads the system identification information.
Syntax: *IDN?
Argument(s): none
Remarks: This function is used to read the system identification information, which is a string consisting of the following data: manufacturer, model, serial number, and firmware version.
Return Value: *mfg* integer count of devices
Example(s): *IDN? returns the following 'Weinschel,8311 Series, 123, 1.00A'

***RST**	**Function:**	Performs a device reset.
	Syntax:	*RST
	Argument(s):	none
	Remarks:	This function is used to reset the device.
	Return Value:	none
	Example(s):	*RST
***OPC**	**Function:**	Operation complete service request.
	Syntax:	*OPC
	Argument(s):	none
	Remarks:	This function generates the Operation Complete message (OPC) in the Standard Event Status Register when all pending device operations have finished.
	Return Value:	none
	Example(s):	*OPC
***OPC?**	**Function:**	Operation complete query
	Syntax:	*OPC?
	Argument(s):	none
	Remarks:	This function loads a '1' into the output queue when the Program Message Unit is executed. Its primary use is to provide an indication of command completion by including the command as the last one in a series of commands.
	Return Value:	1 integer command completed
	Example(s):	SAVE ASSIGN; *OPC? returns a '1' when the SAVE ASSIGN command completes.
***WAI**	**Function:**	Wait To Continue
	Syntax:	*WAI
	Argument(s):	none
	Remarks:	This function prevents the8311 Series from executing any further commands or queries until there are no pending operations. The 8311 Series executes all commands sequentially, and does not allow overlapping commands.
	Return Value:	none
	Example(s):	*WAI

5-9. GENERAL COMMANDS:

CHAN	**Function:**	Selects the currently active channel
	Syntax:	CHAN *chnum*
	Argument(s):	*chnum* integer channel number
	Remarks:	This function is used to select the currently active channel.
	Return Value:	none
	Example(s):	CHAN 1
CHAN?	**Function:**	Reads the current channel number
	Syntax:	CHAN?
	Argument(s):	none
	Remarks:	This function is used to read the currently active channel number.
	Return Value:	*chnum* integer current channel number
	Example(s):	CHAN? returns '1'
ATTN	**Function:**	Set attenuation
	Syntax:	ATTN *atten*
	Argument(s):	atten real desired value, in dB
	Remarks:	This function sets the attenuation of the currently selected channel to atten.
	Return Value:	none
	Example(s):	ATTN 63 ATTN 12.25 ATTN 45.0
ATTN?	**Function:**	Read attenuation
	Syntax:	ATTN?
	Argument(s):	none
	Remarks:	This function reads the attenuation of the currently selected channel.
	Return Value:	*atten* real attenuation value, in dB
	Example(s):	ATTN? returns '63.00'
REL	**Function:**	Sets relative display mode for the current channel
	Syntax:	REL *mode*
	Argument(s):	*mode* integer relative mode on/off
	Remarks:	This function is used to set the relative display mode of operation for the current channel. A value of 0 for the parameter mode will turn relative mode off, while a value of 1 will turn relative mode on.
	Return Value:	none
	Example(s):	REL 1
REF	**Function:**	Sets reference
	Syntax:	REF
	Argument(s):	none
	Remarks:	This function sets the reference value for the active channel to the current attenuation setting. This command is used for the REL and RELATTN functions.
	Return Value:	none
	Example(s):	REF; REL 1 sets the reference, and turns on relative mode
REF?	**Function:**	Read reference setting
	Syntax:	REF?
	Argument(s):	none
	Remarks:	This function reads the reference setting of the currently selected channel.
	Return Value:	*refatten* real reference attenuation value, in dB
	Example(s):	REF? returns '30.00'

RELATTN	**Function:**	Sets attenuation relative to the reference setting
	Syntax:	RELATTN atten
	Argument(s):	*atten* real desired value, in dB
	Remarks:	This function sets the attenuation of the currently selected channel to atten, relative to the reference value set when the REL command was executed.
	Return Value:	none
	Example(s):	RELATTN 10 increases the attenuation setting 10dB from the reference setting RELATTN -10 decreases the attenuation setting by 10dB from the reference setting 15.
RELATTN?	**Function:**	Read relative attenuation of the current channel
	Syntax:	RELATTN?
	Argument(s):	none
	Remarks:	This function reads the relative attenuation of the currently selected channel.
	Return Value:	*relatten* real relative attenuation value, in dB
	Example(s):	RELATTN? returns '-10.00'
STEPSIZE	**Function:**	Sets attenuation stepsize for the current channel
	Syntax:	STEPSIZE atten
	Argument(s):	*atten* real desired stepsize value, in dB
	Remarks:	This function sets the attenuation stepsize for the INCR and DECR commands for the current channel to atten. The default value of the attenuator's stepsize is the intrinsic resolution of the attenuator, i.e., a 127dB/1dB step attenuator has a default stepsize of 1dB.
	Return Value:	none
	Example(s):	STEPSIZE 10 changes the stepsize to 10dB
STEPSIZE?	**Function:**	Read attenuation stepsize
	Syntax:	STEPSIZE?
	Argument(s):	none
	Remarks:	This function reads the attenuation stepsize of the current channel.
	Return Value:	*atten* real attenuation stepsize value, in dB
	Example(s):	STEPSIZE? returns '10.00'
INCR	**Function:**	Increments attenuation
	Syntax:	INCR
	Argument(s):	none
	Remarks:	This function increments the attenuation setting of the current channel by the value of the attenuator's programmed stepsize (see STEPSIZE command).
	Return Value:	none
	Example(s):	INCR
DECR	**Function:**	Decrements attenuation
	Syntax:	INCR
	Argument(s):	none
	Remarks:	This function decrements the attenuation setting of the current channel by the value of the attenuator's programmed stepsize (see STEPSIZE command).
	Return Value:	none
	Example(s):	DECR

6. GENERAL CIRCUIT DESCRIPTION:

This section contains general descriptions and systematic explanation of the Model 8311's design and internal circuitry. Standard 8311 Series SmartStep Attenuator Units contain internal circuitry to control a variety of Aeroflex / Weinschel programmable attenuators (3200T, 150T, and 4200 Series) via front panel controls or standard communications interfaces including GPIB (IEEE-488) and RS-232/RS-422 /RS485. Figure 5 provides a simplified block diagram of the 8311's internal circuitry.

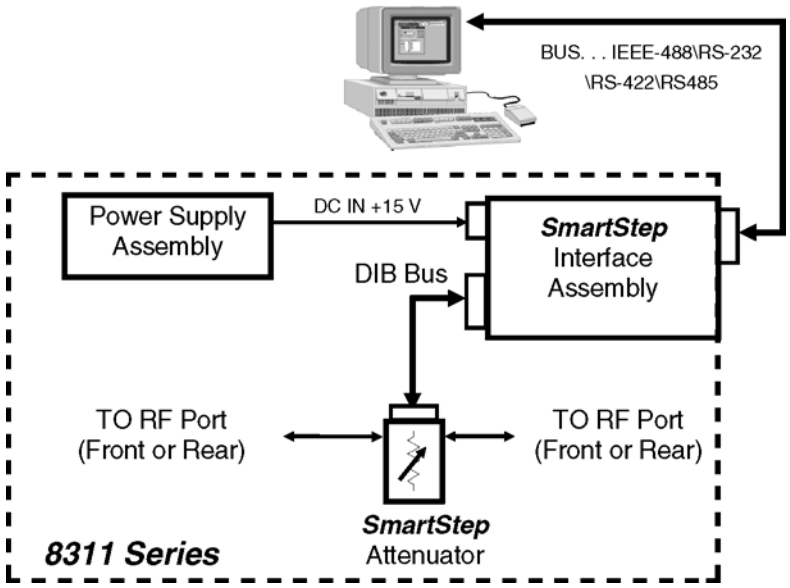


Figure 5. 8311 Series Simplifed Block Diagram

6-1. POWER SUPPLY ASSEMBLY: The Model 8311 contains a high-efficiency switching type Power Supply Assembly (A3) which will operate with a 100 to 240 Vac input power source. The input power source is routed thru the Power Entry Module Assembly (XF1) before being applied to the Power Supply Assembly. The Power Entry Module Assembly allows the user to select between the two operational voltage ranges that can be accepted by the Power Supply Assembly. This Switching Power Supply provides the Model 8311 with +15 ±0.75 V @ 3.3 A outputs. These outputs are then routed to the SmartStep Interface Assembly for distribution to the other assemblies located in the Model 8311. Drawing 193-8102 & 193-8114 shows the actual power distribution for all assemblies and modules located in the 8311.

6-2. STATUS DISPLAYS AND SWITCH CONTROL ASSEMBLY. This assembly located behind the front panel contains a group of LED's that indicates the status of bus operation and channel/port selection . The Switch/LED Status PCB Assembly contains control switches which are used to set the GPIB address information, selected desired port/channel, select the mode of operation (Local or Remote) and manually control and enter parameters for devices installed in the Model 8311. These control switches operate in a toggle fashion, i.e., push for ON and push for OFF. Refer to Section 5 for an operational description of each LED and switch located on the front panel.

6-3. *SmartStep* INTERFACE ASSEMBLY: This assembly is responsible for programming and control of the Driver PCB Assembly, GPIB bus operation, and front panel Switch/LED control. The Smartstep Interface Assembly provides a high-level interface from a standard communications interface including GPIB (IEEE-488) and RS-232/RS-422/RS485, to the 8311 SmartStep's serial Driver Interface Bus. The Device Interface Bus (DIB) is a system for connecting a number of relatively low-speed I/O devices to a host, providing a simple, uniform, and inexpensive way to control a variety of devices via a single port. The DIB is based on the two-wire I2C serial bus and several software protocol layers that allow the *Smartstep* Interface Assembly to address the internal devices, with serial data rates of up to 100 KHz. The DIB may also be used to supply DC power to other devices that may be installed in custom applications, resulting in a simple, low-cost interconnection system.

6-4. RF SECTION: Most Standard 8311 Series are single channel configurations where RF signal is routed through either the front or rear mounted Ports A & B connector (Ports A-A if the RF is routed front to rear) to a single or multiple Weinschel programmable attenuators (3200T, 150T, or 4200 Series) thus creating CH1 (Channel 1). Note that when a Port is in use the Port indicator will be illuminated. Dual channel units typically use Ports A and B for CH1 and Ports C and D for CH2 (Ports A-A if the RF is routed front to rear for CH1 and Ports B-B for CH2). Multi-channel (3-4) units are generally routed front to rear and configured as follows:

CH1 Port A (Front) to Port A (Rear)
CH2 Port B (Front) to Port B (Rear)
CH3 Port C (Front) to Port C (Rear)
CH4 Port D (Front) to Port D (Rear)

For specialized configurations refer to supplemental information in the front of this manual for details.

Typically Aeroflex / Weinschel programmables are bi-directional and the RF signal can be applied to either Port connector. Refer to the individual data sheets located in the Appendix C for detailed and specific specifications pertaining to the internal mounted attenuators. Refer to the replaceable parts list for actual programmable attenuator part/model number.

Special configurations exist where the RF section is designed to specific customer requirements that contain signal programmable attenuators with custom attenuation ranges and step sizes to multiple programmables used in-conjuction with other coaxial devices such as switches, power combiners, directional couplers, and filters creating single or multi-channel subsystems. All specialized 8311 series units will contain a supplement located in the front of this manual that outlines detailed configuration, operation and parts list for these Attenuator Units.

7. MAINTENANCE:

The following paragraphs provide general inspection and maintenance guide lines for the 8311 Series ***SmartStep*** Attenuator Units.

7-1. INSPECTION: Perform a visual inspection in conjunction with the maintenance activities schedule when a malfunction is suspected, or whenever an assembly is removed or replaced.

7-2. PREVENTIVE MAINTENANCE: While the 8311 requires very little preventive maintenance, it should not be subjected to physical abuse, severe mechanical shock, high humidity, or operating temperatures outside the specification range. The instrument should be kept free of excessive dirt and dust, since these can interfere with connector functions and with normal heat dissipation. For cleaning instructions refer to paragraph 7-3 (special cleaning instructions). The following paragraphs provide the preventive maintenance that is to be performed on the Unit.

Care should be taken to prevent strain on the interconnecting cables, since damage here may not always be apparent. Occasionally check the external cables and connectors for signs of cracked insulation and/or bent or worn pins. Tests show that connectors must be clean for accuracy and stability. This requires an inspection and cleaning of each connector immediately before use. For connector cleaning instructions, refer to paragraph 4-3. When cleaning precautions are observed regularly, connectors can maintain their stability for over several thousand connection cycles. Refer to Appendix A for more information about cables and connectors.

7-3. SPECIAL CLEANING INSTRUCTIONS: The cleaning procedures for 8311 are divided into five general groups: microwave coaxial cable assemblies, circuit card and modules; machined surfaces and hardware, chassis cleaning, and connector cleaning.

7-3.1. MICROWAVE COAXIAL CABLE ASSEMBLIES: Appendix A (located at the end of this manual) provides all the necessary procedures for care, cleaning, and handling of microwave coaxial cable assemblies.

7-3.2 CIRCUIT CARDS AND MODULES: A protective coating is applied to circuit cards for protection from moisture, arcing, short-circuiting, and abrasion. To remove light dirt from circuit cards and modules proceed as follows:

CAUTION

- DO NOT use a nylon bristle brush in the solvent as the bristles may dissolve and cause damage to the circuit card or component.
- DO NOT use ultrasonic cleaning on parts or assemblies containing electrical or electronic components.
- DO NOT bend pins of electrical connectors when using fiber-bristle brush.

a. Briskly brush isopropyl alcohol onto area to be cleaned with fiber-bristle brush.

b. Carefully remove residue with a clean lint-free cloth and repeat step "a" as a rinse.

WARNING

Compressed air used for cleaning and/or drying can create airborne particles that may enter the eye. Goggles/ face-shields should be worn. DO NOT direct air stream towards self or other personnel. Pressure should be restricted to a maximum 15 psi to avoid personal injury.

c. When parts are thoroughly clean, dry parts using 5 psi of clean moisture free compressed air or preferably dry nitrogen (pressurized spray will work well).

7-3.3 MACHINED SURFACES AND HARDWARE: To remove light dirt and dust from mechanical parts such as castings, covers and other hardware proceed as follows:

WARNING

Compressed air used for cleaning and/or drying can create airborne particles that may enter the eye. Goggles/ face-shields should be worn. DO NOT direct air stream towards self or other personnel. Pressure should be restricted to a maximum 15 psi to avoid personal injury.

CAUTION

- Under no circumstances use a wire brush, steel wool, or abrasive compound. Using these items will cause extensive damage to the instrument's surface.
- DO NOT use a nylon bristle brush in solvent as the bristles may dissolve and cause damage to the circuit card or component.

a. Use 5 psi of clean, moisture-free compressed air or preferably dry nitrogen to blow loose dirt and dust from surface of item.

b. Briskly brush isopropyl alcohol onto area to be cleaned with a fiber-bristle brush.

c. Remove residue with lint-free cloth and repeat step "b" as a rinse.

d. When parts are thoroughly clean, dry parts using 5 psi of clean, moisture-free compressed air or preferably dry nitrogen.

e. Clean smaller mechanical parts or hardware by dipping into a container of isopropyl alcohol. Remove dirt by brushing with fiber-bristle brush after parts have been immersed for several hours.

f. Remove parts from isopropyl alcohol and rinse by immersing into a different container of isopropyl alcohol.

g. When parts are thoroughly cleaned, dry parts using 5 psi of clean, moisture-free compressed air or preferably dry nitrogen.

7-3.4 CHASSIS CLEANING: Clean chassis using a lint-free cloth moistened with water and mild detergent. For harder to clean areas, such as inside corners of chassis, use a vacuum cleaner.

7-3.5 CONNECTOR CLEANING: Where small amounts of rust, corrosion, and/or oxide deposits are present on connectors, clean externally with a soft-bristle brush, aluminum wool, or internally with an acid brush; then wash with a non-corrosive solvent. MIL-C-83112 is recommended. Exercise care to ensure no metal filing or residue remains inside the connector and the connector is thoroughly dry. Where rust, corrosion, and/or oxide deposits are present in large quantities, replace the connector.

7-4. LINE VOLTAGE FUSE REPLACEMENT: The following steps provide procedures to replace the line voltage Fuse Assembly. This unit accepts a F1.5A, 250 Vac fuse for 115 Vac.

WARNING

Sufficient power levels are present at the Power Input Assembly to cause personal injury. Ensure that the instrument power cord is DISCONNECTED before attempting to change fuses.

CAUTION

DO NOT connect or apply power to this instrument until the Power Entry Module Assembly has been adjusted to the operational line voltage.

a. Disconnect the power cord from the Power Entry Module Assembly.

b. Use a small screwdriver to carefully open the Fuse Drawer.

c. Slide out Fuse Drawer located in the center of the Power Entry Module Assembly.

d. Remove defective fuse and replace with the correct fuse (Refer to applicable parts list for fuse part number).

e. Snap the Fuse Drawer shut and re-connect ac power cord.

8. REPLACEABLE PARTS LIST:

This section lists and describes the parts located in Standard 8311 Series SmartStep Attenuator Units (P/N 193-70XX-X). The Replaceable Parts Lists (RPL) are intended for use in identifying, locating, and requisitioning assemblies and components for the Model 8311.

8-1 UNDERSTANDING REFERENCE DESIGNATORS: All assemblies and electrical parts are identified by standard reference designators (resistors R1, for example). Reference designators are used in parts lists and on parts identification drawings. The title of a parts list or drawing contains the reference designator or the assembly or subassembly to which it applies. The designators in the parts list, as a prefix, but omitted from the list to make it easier to locate a specific part. To complete a reference designator in a parts list, precede the designator for the specific part (DS1, for example) with the designator in the title (A6, for example) to form a complete reference designator for the part (in this case, A6DS1).

8-2 ORDERING INFORMATION: When ordering parts from Weinschel, please include the following information:

- AEROFLEX / Weinschel part number.
- Description of the component or part.
- Model and serial number of the instrument.
- Assembly number and assembly revision (if any) from the assembly (this information is on the component side of the PCB).

8-3 DRAWING NUMBER: The Aeroflex / Weinschel part number consists of a basic number with a dash number. The basic number should cross reference to a drawing number for most of the items. For those items that do not have a drawing number, the manufacturers part number is provided.

8-4 REPLACEABLE PARTS LIST (RPL): This RPL contains a breakdown of the instrument into its major assemblies and detailed parts. The following paragraphs describe the contents of each column of the RPL.

8-4.1 REFERENCE DESIGNATOR: This column contains reference designations arranged in alphanumerical sequence. The letters A thru Z have precedence, followed by numerals 0 thru 9. In addition to the reference designators that are listed, some mechanical parts are also listed. These items lack reference designators and are included because they are considered subject to wear and/or breakage, or because they are custom (non-standard) hardware or parts that might become lost or damaged. This column contains the word N/A for those items or parts not having a reference designator.

8-4.2 DESCRIPTION: This column contains the nomenclature located in the title block of the engineering drawing by the designing activity. The noun name is listed first, followed by modifiers and descriptive information to completely identify the part or assembly.

8-4.3 PART NUMBER: This column contains the Weinschel part number assigned to an assembly, sub-assembly, or detailed part. This also includes Weinschel numbers for specification control, source control, and altered items drawings.

8-4.4 VENDOR PART NO.: This column contains manufacturers part numbers for those parts Weinschel purchases, as off the shelf items and assigns Weinschel part numbers for internal control only. These parts may be ordered through the manufacturer or through Weinschel by the Weinschel part number.

8-4.5 CAGE CODE: This column provides the Commercial and Government Entity (CAGE) code on the same line as the applicable part number. Codes, names, and addresses of venders with an assigned CAGE are listed in Cataloging Handbook H4-1 and H4-2. Vendors that have not been assigned CAGE codes by the government are identified by the word NONE in this column. The names and addresses of these venders can be obtained from Weinschel. Part numbers that have no CAGE numbers listed are manufactured or altered by Weinschel.

8-4.6 ASSEMBLY AND COMPONENT LOCATION: The assembly/component location and schematic diagrams for the different 8311 series models are located in rear of this manual by the drawing number. Drawing find numbers have also been included to help locate components or hardware.

8311-1-6-R, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7301-1, Rev. A):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311	1	NA		
2	193-9207	MOUNTING PLATE	2	NA		
3	3250T-63	ATTEN PRGM, 63dB/1dB STEPS 75 OHMS	6	AT1 - AT6		
4	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
5	193-8096	OVERLAY, FRONT PANEL	1	NA		
6	068-56-15/0	COAXIAL CABLE ASSY, BNC MALE TO FEMALE BULKHEAD, 75 OHM	6	W8, W10, W12, W14 W16, W18	93459	B068-56/15/0
7	193-8049	OVERLAY, PANEL, BLANK	1	NA		
10	193-8117	ASSY, CABLE, CNTRL TO ATTEN (6 ATTEN)	1	W7		
11	NAS662C2R5	SCR FLAT HD 2-56 X 5/16 LG 100	12	NA		
13	NAS1635-04LR4	SCR PAN HD SELFLOCK 4-40 X 1/4	12	NA		
15	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
16	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
17	074-889-4	LABEL, THERMAL TRANSFER, PERM MTLZ POLTEST,1.50 X .75IN	1	NA	BRADY	THT-6-428-10
20	068-56-11/0	COAXIAL CABLE ASSY, BNC MALE TO FEMALE BULKHEAD, 75 OHM	6	W9, W11, W13, W15, W17, W19	93459	B068-56-11/0
22	089-3594	ICD, MULTI-CHANNEL UNIT, MODEL 8311-1-XX	0	NA		
23	193-8114	WIRING DIAGRAM, MODEL 8311	0	NA		
24	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7301-1, Rev. A for parts location.

8311-1-6-F, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7301-2, Rev. A):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311	1	NA		
2	193-9207	MOUNTING PLATE	2	NA		
3	3250T-63	ATTEN PRGM, 63dB/1dB STEPS 75 OHMS	6	AT1 - AT6		
4	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
5	193-8096	OVERLAY, FRONT PANEL	1	NA		
6	068-56-15/0	COAXIAL CABLE ASSY, BNC MALE TO FEMALE BULKHEAD, 75 OHM	6	W8, W10, W12, W14 W16, W18	93459	B068-56/15/0
7	193-8049	OVERLAY, PANEL, BLANK	1	NA		
10	193-8117	ASSY, CABLE, CNTRL TO ATTEN (6 ATTEN)	1	W7		
11	NAS662C2R5	SCR FLAT HD 2-56 X 5/16 LG 100	12	NA		
13	NAS1635-04LR4	SCR PAN HD SELFLOCK 4-40 X 1/4	12	NA		
15	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
16	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
17	074-889-4	LABEL, THERMAL TRANSFER, PERM MTLZ POLTEST,1.50 X .75IN	1	NA	BRADY	THT-6-428-10
20	068-56-11/0	COAXIAL CABLE ASSY, BNC MALE TO FEMALE BULKHEAD, 75 OHM	6	W9, W11, W13, W15, W17, W19	93459	B068-56-11/0
22	089-3594	ICD, MULTI-CHANNEL UNIT, MODEL 8311-1-XX	0	NA		
23	193-8114	WIRING DIAGRAM, MODEL 8311	0	NA		
24	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7301-2, Rev. A for parts location.

8311-38-6-F, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7302-2, Rev. B):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311	1	NA		
2	193-8039	MOUNTING PLATE	2	NA		
3	3206T-1	ATTEN PRGM, SMARTSTEP	6	AT1 - AT6		
4	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
5	193-8096	OVERLAY, FRONT PANEL	1	NA		
6	068-32-13/0	COAXIAL CABLE ASSY, SMA M/ TYPE N FEMALE, CONFORMABLE, DC-11GHz	6	W8, W10, W12, W14, W16, W18		
7	193-8049	OVERLAY, PANEL BLANK	1	NA		
8	193-11347	SPACER, CONN, 12 POS	1	NA		
9	063-408	N -TYPE, CONNECTOR	12	NA		
10	193-8116	ASSY, CABLE, CNTRL TO ATTEN (6 ATTEN)	1	W7		
11	MS24693-C3	SCR FLAT HD 4-40 X 5/16 LG 100	12	NA		
13	NAS1635-04LR4	SCR PAN HD SELFLOCK 4-40 X 1/4	12	NA		
15	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
16	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
17	074-889-4	LABEL, THERMAL TRANSFER, PERM MTLZ, POLTEST,1.50 X .75IN	1	NA	BRADY	THT-6-428-10
20	068-32-6/0	COAXIAL CABLE ASSY, SMA M/ TYPE N FEMALE, CONFORMABLE, DC-11GHz	6	W9, W11, W13, W15, W17, W19	93459	068-50-6/0
22	089-3584	ICD, MULTI CHANNEL UNIT, MODEL 8311-38-12-T	0	NA		
23	193-8114	WIRING DIAGRAM, MODEL 8311	0	NA		
24	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7302-2, Rev B for parts location.

8311-38-12-T, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7302-8, Rev. D):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311	1	NA		
2	193-8039	MOUNTING PLATE	1	NA		
3	3206T-1	ATTEN PRGM, SMARTSTEP	12	AT1-AT12		
4	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
5	193-8047	OVERLAY, FRONT PANEL, TYPE N	1	NA		
6	068-32-8/0	COAXIAL CABLE ASSY, SMA M/TYPE N FEMALE, CONFORMABLE, DC-18 GHz	12	W16-W23 W24, W26, W28, W30		068-50-8/0
7	193-8052	OVERLAY, REAR PANEL, TYPE N	1	NA		
8	193-8106	MOUNTING PLATE, ATTEN	1	NA		
9	193-8107	MOUNTING PLATE, ATTEN	1	NA		
10	193-8105	ASSY, CABLE, CNTRL TO ATTEN (12 ATTEN)	1	W7		
11	MS24693-C3	SCR PAN HD 4-40 X 5/16 LG	24	NA		
12	193-11347	SPACER, CONN, 12 POS	1	NA		
13	NAS1635-04LR4	SCR PAN HD 4-40 X 5/16 LG	14	NA		
14	063-408	N -TYPE, CONNECTOR	12	NA		
15	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
16	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
17	074-889-4	LABEL	1	NA		
20	068-32-6/0	COAXIAL CABLE ASSY SMA M/TYPE N FEMALE, CONFORMABLE, DC-18 GHz	12	W8-W15 W25, W27, W29, W31	93459	068-50-6/0
21	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		
22	193-8114	WIRING DIAGRAM, MODEL 8311	0	NA		
23	089-3584	ICD ATTEN UNIT, MODEL 8311	0	NA		

Refer to Aeroflex / Weinschel Drawing 193-7302-8, Rev. D for parts location.

8311-137-6-F, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7303-2, Rev. D)

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051-1	ASSY, ATTEN UNIT, BASE MODEL 8311(+5V)	1	NA		
2	193-8121	MOUNTING PLATE	2	NA		
3	101-2070-1	ASSY, ATTEN, PROG, 6 CELL, 63dB/1dB, 3 GHz, SMA F/F	6	AT1 - AT6		
4	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
5	193-8096	OVERLAY, FRONT PANEL	1	NA		
6	32	COAXIAL CABLE ASSY, SMA M/ TYPE N FEMALE, CONFORMABLE, DC-11GHz	6	W9, W11, W13, W15, W17, W19	93459	068-50-6/0
7	193-8049	OVERLAY, PANEL BLANK	1	NA		
8	068-32-13/0	COAXIAL CABLE ASSY, SMA M/ TYPE N FEMALE, CONFORMABLE, DC-11GHz	6	W8, W10, W12, W14, W16, W18		
9	193-11347	SPACER, CONN, 12 POS	1	NA		
10	063-408	N -TYPE, CONNECTOR	12	NA		
11	NAS662C2R5	SCR FLAT HD 2-56 X 5/16 LG 100	12	NA		
13	NAS1635-04LR4	SCR PAN HD SELFLOCK, 4-40 X 1/4	12	NA		
15	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
16	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
17	074-889-4	LABEL, THERMAL TRANSFER, PERM MTLZ POLTEST,1.50 X .75IN	1	NA	BRADY	THT-6-428-10
18	193-8086-3	ASSY, CABLE, DIST BD TO ATTEN	1	W23		
19	193-8086-4	ASSY, CABLE, DIST BD TO ATTEN	1	W24		
20	193-8086-5	ASSY, CABLE, DIST BD TO ATTEN	1	W25		
21	193-8086-6	ASSY, CABLE, DIST BD TO ATTEN	1	W20		
22	193-8086-7	ASSY, CABLE, DIST BD TO ATTEN	1	W21		
23	193-8086-8	ASSY, CABLE, DIST BD TO ATTEN	1	W22		
28	089-3599	ICD, MULTI-CHANNEL UNIT, MODEL 8311-137-X-X	0	NA		
29	193-8120	WIRING DIAGRAM, MODEL 8311(+5V)	0	NA		
30	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7303-2, Rev. D for parts location.

8311-137-6-R, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7303-12, Rev. C)

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051-1	ASSY, ATTEN UNIT, BASE MODEL 8311(+5V)	1	NA		
2	193-8121	MOUNTING PLATE	2	NA		
3	101-2070-1	ASSY, ATTEN, PROG, 6 CELL, 63dB/1dB, 3 GHz, SMA F/F	6	AT1 - AT6		
4	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
5	193-8096-1	OVERLAY, REAR PANEL	1	NA		
6	068-32-6/0	COAXIAL CABLE ASSY, SMA M/TYPE N FEMALE, CONFORMABLE, DC-11 GHz	6	W8, W10, W12, W14, W16, W18	93459	068-50-6/0
7	193-8049	OVERLAY, PANEL BLANK	1	NA		
8	068-32-13/0	COAXIAL CABLE ASSY, SMA M/TYPE N FEMALE, CONFORMABLE, DC-11 GHz	6	W9, W11, W13, W15, W17, W19		
9	193-11347	SPACER, CONN, 12 POS	1	NA		
10	063-408	N -TYPE, CONNECTOR	12	NA		
11	NAS662C2R5	SCR FLAT HD 2-56 X 5/16 LG 100	12	NA		
13	NAS1635-04LR4	SCR PAN HD SELFLOCK, 4-40 X 1/4	12	NA		
15	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
16	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
17	074-889-4	LABEL, THERMAL TRANSFER, PERM MTLZ POLTEST,1.50 X .75IN	1	NA	BRADY	THT-6-428-10
18	193-8086-3	ASSY, CABLE, DIST BD TO ATTEN	1	W23		
19	193-8086-4	ASSY, CABLE, DIST BD TO ATTEN	1	W24		
20	193-8086-5	ASSY, CABLE, DIST BD TO ATTEN	1	W25		
21	193-8086-6	ASSY, CABLE, DIST BD TO ATTEN	1	W20		
22	193-8086-7	ASSY, CABLE, DIST BD TO ATTEN	1	W21		
23	193-8086-8	ASSY, CABLE, DIST BD TO ATTEN	1	W22		
28	089-3724	ICD, MULTI-CHANNEL ATTEN UNIT	0	NA		
29	193-8120	WIRING DIAGRAM, MODEL 8311(+5V)	0	NA		
30	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7303-12, Rev. C for parts location.

8311-202-2-F, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7305-2, Rev. D):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311	1	NA		
2	193-8054	OVERLAY, FRONT PANEL SMA	1	NA		
3	193-8049	OVERLAY, PANEL BLANK	1	NA		
4	193-8042	MOUNTING PLATE	2	NA		
6	150T-11	ATTEN PRGM, SMARTSTEP	2	AT2, AT4		
7	150T-110	ATTEN PRGM, SMARTSTEP	2	AT1, AT3		
10	1568	ADAPT WPM 3 BULKHD	4	NA		
11	068-32-4/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE DC TO 18 GHz	2	W9, W12		068-32-4/0
12	068-32-6/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE DC TO 18 GHz	2	W8, W10		068-32-6/0
13	068-32-12/0	COAXIAL CABLE ASSY SMA M/M, CONFORMABLE DC - 18 GHz	2	W11, W13		B068-32-12/0
14	193-9646	CONNECTOR ADAPTER, PLATE	4	NA		
15	193-8101	ASSY CONTROLLER TO ATTEN	1	W7		
16	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
17	074-761-1	HOLE PLUG 3/8 HOLE, NYLON BLK	8	NA	83330	3091
18	074-921	FEET NON-SKID	4	NA	4963	SJ-5008 BLACK
19	NAS1635-04LR4	SCR PAN HD SELFLOCK, 4-40 X 1/4	12	NA		
20	MS24693-C3	SCR FLAT HD 4-40 X 5/16 LG 100	8	NA		
21	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
22	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
25	090-301	* LABEL STD, 1.5 X .75 IN	1	NA		
26	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		
27	193-8102	WIRING DIAGRAM, MODEL 8311	0	NA		
28	089-3574	ICD ATTEN UNIT, MODEL 8311	0	NA		

Refer to Aeroflex / Weinschel Drawing 193-7305-2, Rev. D for parts location.

8311-202-3-F, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7305-3, Rev. D):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311	1	NA		
2	193-8054	OVERLAY, FRONT PANEL SMA	1	NA		
3	193-8049	OVERLAY, PANEL BLANK	1	NA		
4	193-8042	MOUNTING PLATE	2	NA		
6	150T-11	ATTEN PRGM, SMARTSTEP	3	AT2, AT4, AT6		
7	150T-110	ATTEN PRGM, SMARTSTEP	3	AT1, AT3, AT5		
10	1568	ADAPT WPM 3 BULKHD	6	NA		
11	068-32-4/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE DC TO 18 GHz	3	W9, W12, W15		068-32-4/0
12	068-32-6/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE DC TO 18 GHz	2	W8, W10		068-32-6/0
13	068-32-12/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE DC TO 18 GHz	4	W11, W13, W14, W16		B068-32-12/0
14	193-9646	CONNECTOR ADAPTER PLATE	6	NA		
15	193-8101	ASSY CONTROLLER TO ATTEN	1	W7		
16	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
17	074-761-1	HOLE PLUG 3/8 HOLE NYLON BLACK	6	NA	83330	3091
18	074-921	FEET NON-SKID	4	NA	4963	SJ-5008 BLACK
19	NAS1635-04LR4	SCR PAN HD SELFLOCK, 4-40 X 1/4	17	NA		
20	MS24693-C3	SCR FLAT HD 4-40 X 5/16 LG 100	12	NA		
21	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
22	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
25	090-301	* LABEL STD 1.5 X .75 IN	1	NA		
26	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		
27	193-8102	WIRING DIAGRAM, MODEL 8311	0	NA		
28	089-3574	ICD, ATTEN UNIT, MODEL 8311 150 ATTENS	0	NA		

Refer to Aeroflex / Weinschel Drawing 193-7305-3, Rev. D for parts location.

8311-204-6-F, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7304-2, Rev. A):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311	1	NA		
2	193-8054	OVERLAY, FRONT PANEL SMA	1	NA		
3	193-8049	OVERLAY, PANEL BLANK	1	NA		
4	193-8042	MOUNTING PLATE	2	NA		
6	150T-62	ATTEN PRGM,	6	AT1 - AT6		
7	193-8118	MOUNTING PLATE	1	NA		
8	1568	ADAPT WPM 3 BULKHD	12	NA		
9	068-32-6/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W9, W11		068-32-6/0
10	068-32-8/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	3	W15, W17, W19		B068-32-8/0
11	068-32-10/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	3	W8, W10, W13		B068-32-10/0
12	068-32-12/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W14, W16		B068-32-12/0
13	068-32-13/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W12, W18		B068-32-13/0
14	193-9646	CONNECTOR ADAPTER PLATE	12	NA		
15	193-8119	ASSY, CABLE, CONTROLLER TO ATTEN	1	W7		
16	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
17	090-301	* LABEL STD, 1.5 X .75 IN	1	NA		
18	074-921	FEET NON-SKID	4	NA	4963	SJ-5008 BLACK
19	NAS1635-04LR4	SCR PAN HD SELFLOCK, 4-40 X 1/4	17	NA		
20	MS24693-C3	SCR FLAT HD 4-40 X 5/16 LG 100	12	NA		
21	090-445	* LABEL, REFERENCE INSTRUCTION MANUAL	1	NA		
22	090-354	* LABEL WARNING, HIGH VOLTAGE	1	NA		
26	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		
27	193-8114	WIRING DIAGRAM, MODEL 8311	0	NA		
28	089-3574	ICD ATTEN UNIT, MODEL 8311, 150 ATTENS	0	NA		

Refer to Aeroflex / Weinschel Drawing 193-7304-2, Rev. A for parts location.

8311-352-3-R, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7306-13, Rev. A):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311 (+15V), 2U	1	NA		
2	193-10265	MOUNTING PLATE	1	NA		
3	193-9664	ASSY, CABLE, PSU TO DISTRIBUTION, 15V	1	W4		
4	193-8054-1	OVERLAY REAR PANEL SMA	1	NA		
5	193-8049	OVERLAY, PANEL BLANK	1	NA		
6	193-8053-001	ASSY, PCB, DISTRIBUTION, 14 PIN	1	A5		
7	193-10066	SPACER, CONNECTOR, 12 POS	1	NA		
8	193-8085	ASSY, CABLE, CONTROLLER TO DISTRIBUTION	1	W7		
11	193-10342	ASSY CABLE ATTEN TO DIST	1	W11		
12	068-32-5/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	1	W17	93459	B068-32-5/0
17	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
18	090-301	* LABEL STD 1.5 X .75 IN	1	NA		
20	3408T-103	ATTEN PRGM	3	AT1 - AT3		
21	1568	ADAPT WPM 3 BULKHD	6	NA		
22	074-761-1	HOLE PLUG 3/8 HOLE NYLON BLACK	6	NA	83330	3091
23	068-32-4/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W13, W15	93459	B068-32-4/0
24	068-32-12/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	3	W14, W16, W18	93459	B068-32-12/0
27	NAS1635-04LR4	SCR PAN HD SELFLOCK 4-40 X 1/4	4	NA		
28	NAS662C2LPR3	SCR, FLT HD, #2-56 X 3/16 LG, SELF-LOCK	6	NA		
29	NAS1635-04LR5	SCR PAN HD SELF LOCK 4-40X5/16	4	NA		
30	MS15795-803	WASHER FLAT .125 ID .250 OD	4	NA		
33	193-8129	WIRING DIAGRAM	0	NA		
34	089-3868	ICD ATTEN UNIT MODEL 8311-352-X-T	0	NA		
35	IM303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7306-13, Rev. A for parts location.

8311-352-4-R, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7306-14, Rev. B):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311 (+15V), 2U	1	NA		
2	193-10265	MOUNTING PLATE	1	NA		
3	193-9664	ASSY, CABLE, PSU TO DISTRIBUTION, 15V	1	W4		
4	193-8054-1	OVERLAY REAR PANEL, SMA	1	NA		
5	193-8049	OVERLAY, PANEL BLANK	1	NA		
6	193-8053-001	ASSY, PCB, DISTRIBUTION, 14 PIN	1	A5		
7	193-10066	SPACER, CONNECTOR, 12 POS	1	NA		
8	193-8085	ASSY, CABLE, CONTROLLER TO DISTRIBUTION	1	W7		
11	193-10342	ASSY CABLE ATTEN TO DIST	1	W11		
12	068-32-5/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W17, W19	93459	B068-32-5/0
17	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
18	090-301	* LABEL STD, 1.5 X .75 IN	1	NA		
20	3408T-103	ATTEN PRGM, SMARTSTEP	4	AT1 - AT4		
21	1568	ADAPT WPM 3 BULKHD	8	NA		
22	074-761-1	HOLE PLUG 3/8 HOLE NYLON BLACK	4	NA	83330	3091
23	068-32-4/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W13,W15		B068-32-4/0
24	068-32-12/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	4	W14, W16, W18, W20	93459	B068-32-12/0
27	NAS1635-04LR4	SCR PAN HD SELFLOCK 4-40 X 1/4	4	NA		
28	NAS662C2LPR3	SCR, FLT HD, #2-56 X 3/16 LG, SELF-LOCK	6	NA		
29	NAS1635-04LR5	SCR PAN HD SELF LOCK 4-40X5/16	4	NA		
30	MS15795-803	WASHER FLAT .125 ID, .250 OD	4	NA		
31	079R-198-1	SPIRAL WRAP, 3/16 OD NATURAL	2	NA	6383	T25F-C
33	193-8129	WIRING DIAGRAM	0	NA		
34	089-3868	ICD ATTEN UNIT, MODEL 8311-352-X-T	0	NA		
35	IM303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7306-14, Rev. B for parts location.

8311-352-6-F, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7306-2, Rev. B):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311 (+15V) 2U	1	NA		
2	193-10265	MOUNTING PLATE	2	NA		
3	193-9664	ASSY, CABLE, DC POWER	1	W4		
4	193-8054	OVERLAY, FRONT PANEL, SMA	1	NA		
5	193-8049	OVERLAY, PANEL BLANK	1	NA		
6	193-8053-001	ASSY, PCB, DISTRIBUTION, 14 PIN	1	A5		
7	193-10066	SPACER, CONNECTOR, 12 POS	1	NA		
8	193-8085	ASSY, CABLE, CONTROLLER TO DISTRIBUTION	1	W7		
11	193-10342	ASSY CABLE, ATTEN TO DIST	1	W11		
12	193-10343	ASSY CABLE ATTEN TO DIST	1	W12		
17	074-912	KIT, RACK MOUNTING W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
18	090-301	* LABEL STD 1.5 X .75 IN	1	NA		
20	3408T-103	ATTEN PRGM SMARTSTEP	6	AT1 - AT6		
21	1568	ADAPT WPM 3 BULKHD	12	NA		
23	068-32-4/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	6	W13, W15, W17, W19 W21, W23		B068-32-4/0
24	068-32-12/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	6	W14, W16, W18, W20, W22, W24		B068-32-12/0
27	NAS1635-04LR4	SCR PAN HD SELFLOCK, 4-40 X 1/4	8	NA		
28	NAS662C2LPR3	SCR, FLT HD, #2-56 X 3/16 LG, SELF-LOCK	12	NA		
29	NAS1635-04LR5	SCR PAN HD SELF LOCK 4-40X5/16	4	NA		
30	MS15795-803	WASHER FLAT .125 ID, .250 OD	4	NA		
33	193-8129	WIRING DIAGRAM, MODEL 8311	0	NA		
34	089-3868	ICD ATTEN UNIT, MODEL 8311-352-9-T	0	NA		
35	IM-303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7306-2, Rev. B for parts location.

8311-352-9-T, Attenuator Unit Assembly Replaceable Parts List (P/N 193-7306-9, Rev. C):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8051	ASSY, BASE UNIT, MODEL 8311 (+15V) 2U	1	NA		
2	193-10265	MOUNTING PLATE	2	NA		
3	193-10265-1	MOUNTING PLATE	1	NA		
4	193-8046	OVERLAY, FRONT PANEL SMA	1	NA		
5	193-8046-1	OVERLAY, FRONT PANEL SMA	1	NA		
6	193-8053-001	ASSY, PCB, DISTRIBUTION, 14 PIN	1	A5		
7	193-10066	SPACER, CONNECTOR, 12 POS	2	NA		
8	193-8085	ASSY, CABLE, CONTROLLER TO DISTRIBUTION	1	W7		
9	193-9664	ASSY CABLE, DC POWER	1	W4		
10	193-9300-2	ASSY, CABLE, DIST TO ATTEN	1	W10		
11	193-10342	ASSY, CABLE, ATTEN TO DIST	1	W11		
12	193-10343	ASSY, CABLE, ATTEN TO DIST	1	W12		
16	074-761-1	HOLE PLUG 3/8 HOLE, NYLON BLACK	6	NA	83330	3091
17	074-912	KIT, RACK MOUNTING, W/O HANDLES 3.5 H	1	NA	24803	K2RMX-001A
18	090-301	* LABEL STD, 1.5 X .75 IN	1	NA		
20	3408T-103	ATTEN PRGM, SMARTSTEP	9	AT1 - AT9		
21	1568	ADAPT WPM 3 BULKHD	18	NA		
23	068-32-4/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	10	W13 - W16, W21 - W25 W30		B068-32-4/0
24	068-32-5/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W17, W26		B068-32-5/0
25	068-32-6/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	2	W18,W27		B068-32-6/0
26	068-32-7/0	COAXIAL CABLE ASSY, SMA M/M, CONFORMABLE, DC TO 18 GHz	4	W19, W20, W28, W29		
27	NAS1635-04LR4	SCR PAN HD SELFLOCK, 4-40 X 1/4	14	NA		
28	NAS662C2LPR4	SCR, FLT HD, #4-40 X 1/4 LG, SELF-LOCK	18	NA		
29	NAS1635-04LR5	SCR PAN HD SELF, LOCK 4-40X5/16	4	NA		
30	MS15795-803	WASHER FLAT .125 ID, .250 OD	4	NA		
33	193-8129	WIRING DIAGRAM	0	NA		
34	089-3868	ICD ATTEN UNIT, MODEL 8311-352-9-T	0	NA		
35	IM303	O & S, ATTEN UNIT, MODEL 8311	1	NA		

Refer to Aeroflex / Weinschel Drawing 193-7306-9, Rev. C for parts location.

Basic Model 8311 Assembly Replaceable Parts List (P/N 193-8051, Rev. A):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8050	ENCLOSURE, MODIFIED	1	NA		
2	193-8048	CHASSIS	1	NA		
5	193-9176	ASSY CABLE PSU TO CONT	1	W4		
6	193-9177	ASSY CABLE PWR/INPUT TO PSU	1	W5		
7	193-8023-001	ASSY, PCB,CONTROLLER, W/IEEE CONN	1	A1		
9	193-9126-000	ASSY, PCB, ADDRESS SWITCH	1	NA		
10	193-8005-1	ASSY, CABLE RS232 CONT TO R/P	1	W3		
13	193-9236	OVERLAY	1	NA		
15	193-8029-001	ASSY, PCB, FRONT PANEL DISPLAY	1	A3		
16	193-8028-000	ASSY, PCB, CONTROL, FRONT PNL	1	A4		
17	001-400-15	PSU, SWITCHER +15V DC, 3.3A	1	A2	60975	GLC50-15
18	051-40	FUSE HOLDER, POWER INPUT, W/SWITCH	1	XF1	5245	PSOSXSS6B
20	193-9193	ASSY, CABLE, CONTROLLER TO FRONT PANEL DISPLAY	1	W6		
22	062-184-5	CONN SCREW LOCK FEMALE	2	NA	71468	D20418-2
23	068-39-2	CABLE ASSY, 16 COND RIBBON, 6 INCH LG	1	W2	D-KEY	A8PPG-1606M-ND
24	068-21	CORD PWR 3-CONDUCTOR DTCH 7.5FT 10A-125V NEMA5-15P/IEC320-C13	1	NA	16428	17250
31	062-380-1	SCREW LOCK, HARDWARE KIT METRIC, #6-32 UNC-2A EXT THDS	1	NA	779	554808-1
32	090-285	*NAMEPLATE HIGH VOLTAGE	1	NA		
33	193-9159	ASSY, CABLE, GND	1	W1		
34	052-1-1/5	FUSE 1.5 AMP, 250V	1	F1	75915	312.01.5
36	MS51957-19	SCR PAN HD 4-40 X 3/4 LG	2	NA		
37	090-353	* LABEL GROUND	1	NA		
38	090-467	*LABEL, POWER INPUT	1	NA		
39	MS51957-17	SCR PAN HD 4-40 X 1/2 LG	4	NA		
40	MS15795-803	WASHER FLAT .125 ID .250 OD	12	NA		
41	MS35338-135	WASHER LOCK #4	12	NA		
42	MS51957-14	SCR PAN HD 4-40 X 5/16 LG	6	NA		
43	MS24693-C3	SCR FLAT HD 4-40 X 5/16 LG 100	6	NA		
44	MS35649-244	NUT HEX #4	1	NA		
45	MS51957-15	SCR PAN HD 4-40 X 3/8 LG	2	NA		
46	MS51859-2	WASHER FLAT #4 NYLON	2	NA		

Refer to Aeroflex / Weinschel Drawing 193-8051, Rev. A for parts location.

Basic Model 8311 (+5V) Assembly Replaceable Parts List (P/N 193-8051-1, Rev. A):

Find No.	Part Number	Description	Quantity Used	Reference Designator	CAGE Code	Vendor Part Number
1	193-8050	ENCLOSURE, MODIFIED	1	NA		
2	193-8048	CHASSIS	1	NA		
5	193-8088	ASSY, CABLE, DC PWR	1	W4		
6	193-9177	ASSY CABLE PWR/INPUT TO PSU	1	W5		
7	193-8023-004	ASSY, PCB,CONTROLLER, +5V, W/IEEE CONN	1	A1		
8	193-8053-000	ASSY PCB, DISTRIBUTION MODULE	1	A5		
9	193-9126-000	ASSY, PCB, ADDRESS SWITCH	1	NA		
10	193-8005-1	ASSY CABLE RS232 CONT TO R/P	1	W3		
11	193-8085	ASSY, CABLE, CONTROLLER TO DISTRIBUTION	1	W7		
13	193-9236	OVERLAY	1	NA		
15	193-8029-001	ASSY, PCB, FRONT PANEL DISPLAY	1	A3		
16	193-8028-000	ASSY, PCB, CONTROL, FRONT PANEL	1	A4		
17	001-400-5	PSU SWITCHER, +5V DC, 8A	1	A2	6975	GLC50-5
18	051-40	FUSE HOLDER, POWER, INPUT W/SWITCH	1	XF1	5245	PSOSXSS6B
20	193-9193	ASSY, CABLE, CONTROLLER TO FRONT PANEL DISPLAY	1	W6		
22	062-184-5	CONN SCREW LOCK, FEMALE	2	NA	71468	D20418-2
23	068-39-2	CABLE ASSY, 16 COND RIBBON, 6 INCH LG	1	W2	D-KEY	A8PPG-1606M-ND
24	068-21	CORD PWR 3-CONDUCTOR DTCH 7.5FT 10A-125V NEMA5-15P/IEC320-C13	1	NA	16428	17250
31	062-380-1	SCREW LOCK, HARDWARE KIT, METRIC, #6-32 UNC-2A EXT THDS	1	NA	779	554808-1
32	090-285	*NAMEPLATE HIGH VOLTAGE	1	NA		
33	193-9159	ASSY, CABLE, GND	1	W1		
34	052-1-1/5	FUSE 1.5 AMP, 250V	1	F1	75915	312.01.5
36	MS51957-19	SCR PAN HD 4-40 X 3/4 LG	2	NA		
37	090-353	* LABEL GROUND	1	NA		
38	090-467	*LABEL, POWER INPUT	1	NA		
39	MS51957-17	SCR PAN HD 4-40 X 1/2 LG	4	NA		
40	MS15795-803	WASHER FLAT .125 ID .250 OD	16	NA		
41	MS35338-135	WASHER LOCK #4	16	NA		
42	MS51957-14	SCR PAN HD 4-40 X 5/16 LG	10	NA		
43	MS24693-C3	SCR FLAT HD 4-40 X 5/16 LG 100	6	NA		
44	MS35649-244	NUT HEX #4	1	NA		
45	MS51957-15	SCR PAN HD 4-40 X 3/8 LG	2	NA		
46	MS51859-2	WASHER FLAT #4 NYLON	2	NA		

Refer to Aeroflex / Weinschel Drawing 193-8051-1, Rev. A for parts location.

9. APPLICATIONS:

Applications for the 8311 Series range from providing control of a single ***SmartStep*** Attenuator in a bench test/lab environment using a PC and a terminal emulator, to complex system applications where the 8311 Series is employed to control many devices to create custom/semi-custom subsystems to reduce overall design cost. Weinschel can provide a variety of custom designed driver interfaces for various devices, such as RF switches, relays, pin attenuators, motorized step attenuators, displays, and other devices, as well as complete subsystem design and integration services. Contact us with your specialized needs.

10. ACCESSORIES:

Part Number	Description
193-8033-1	Rack Mounting Kit, Single 8311
7005-X	PLANAR CROWNS® ...refer to data sheet in Appendix C for model numbers and applicable crown specifications.

11. CONTACTING AEROFLEX / WEINSCHEL:

In the event of a malfunction, contact Aeroflex / Weinschel, Inc. An apparent malfunction of an instrument or component may be diagnosed over the phone by first contacting the Customer Service Department at Aeroflex / Weinschel, Inc. DO NOT send the instrument or component back to the factory without prior authorization. When it is necessary to return an item, state the symptoms, catalog and type number of the instrument or component, and date of original purchase. Also write the Company name and your name and phone number on a card and tape the card to the item returned. Page provides further information regarding preparation of a unit for reshipment. Contact Weinschel, Inc. Customer Service Department as follows:

Via mail: Aeroflex / Weinschel, Inc.
5305 Spectrum Drive
Frederick, MD 21703-7362
U.S.A.

Via Telefax: 301-846-9116

Via Phone: Call TOLL FREE 800-638-2048
Toll call # 301-846-9222

Via Website: www.aeroflex-weinschel.com

Via e-mail: weinschel-sales@aeroflex.com

12. AEROFLEX / WEINSCHEL WARRANTY:

PRODUCTS - Aeroflex / Weinschel, Inc. warrants each product it manufactures to be free from defects in material and workmanship under normal use and service anywhere in the world. Aeroflex / Weinschel, Inc.'s only obligation under this Warranty is to repair or replace, at its plant, any product or part thereof that is returned with transportation charges prepaid to Aeroflex / Weinschel, Inc. by the original purchaser within ONE YEAR from the date of shipment.

The foregoing Warranty does not apply Aeroflex / Weinschel, Inc.'s sole opinion to products that have been subject to improper or inadequate maintenance, unauthorized modifications, misuse, or operation outside the environmental specifications for the product.

SOFTWARE PRODUCTS- Aeroflex / Weinschel, Inc. software products are supplied without representation or Warranty of any kind. Aeroflex / Weinschel, Inc., therefore, assumes no responsibility and will not accept liability (consequential or otherwise) arising from the use of program materials, disk, or tape.

The Warranty period is controlled by the Warranty document furnished with each product and begins on the date of shipment. All Warranty returns must be authorized by Aeroflex / Weinschel, Inc. prior to their return.

Aeroflex / Weinschel, Inc.'s Quality System Certified to:

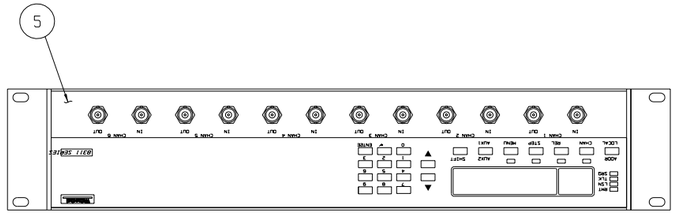
INTERTEK ISO 9001:2008 ANAB ACCREDITED

Certificate No. 289j

© 1999-2010 Aeroflex / Weinschel, Inc.

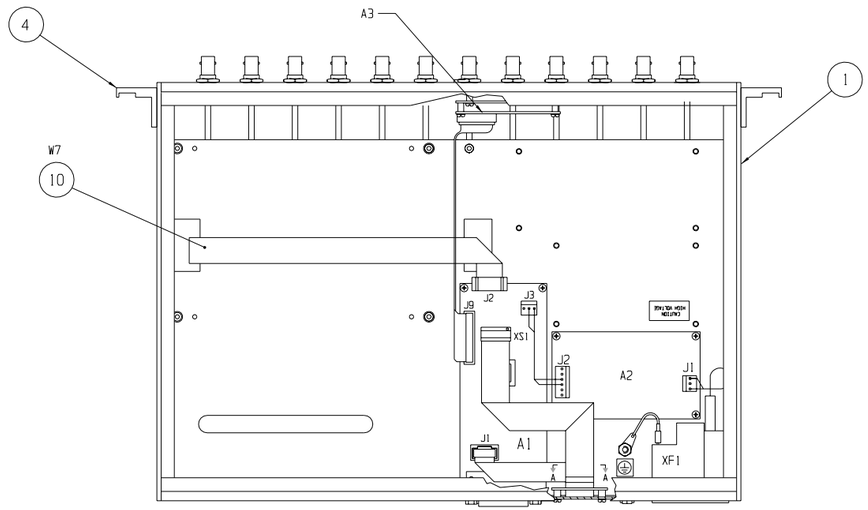
DWG. NO.	SH 1	REV.

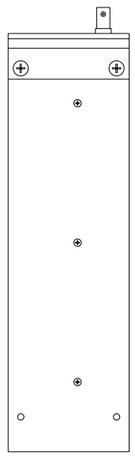
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-173		

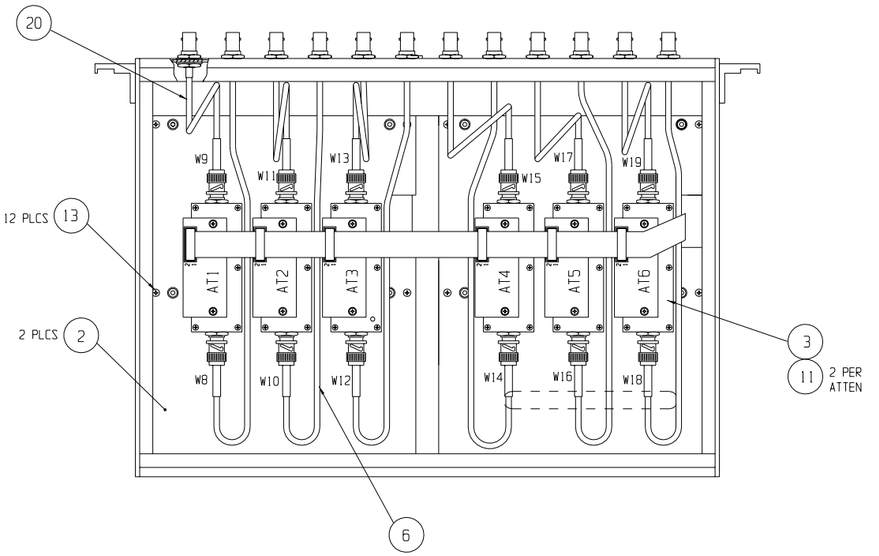


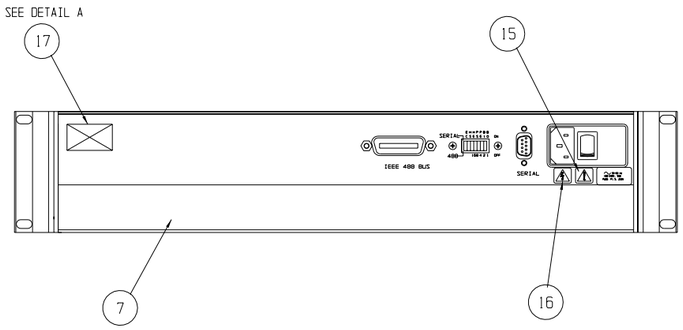
MCE/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-1-6-F SERNO:
FREQ:DC-1.0GHz(75 OHM)
CHAN:6
ATTEN:63/1dB STEPS CE

DETAIL A









W19	AT6-J1	F/P CHAN 6 IN
W18	AT6-J2	F/P CHAN 6 OUT
W17	AT5-J1	F/P CHAN 5 IN
W16	AT5-J2	F/P CHAN 5 OUT
W15	AT4-J1	F/P CHAN 4 IN
W14	AT4-J2	F/P CHAN 4 OUT
W13	AT3-J1	F/P CHAN 3 IN
W12	AT3-J2	F/P CHAN 3 OUT
W11	AT2-J1	F/P CHAN 2 IN
W10	AT2-J2	F/P CHAN 2 OUT
W9	AT1-J1	F/P CHAN 1 IN
W8	AT1-J2	F/P CHAN 1 OUT
W7	A1-J2	AT1 THRU AT6
DES	FROM	TO

CABLE CHART

NOTES:

1. PERMANENTLY MARK MODEL NO., CHANNEL NO. & SERIAL NO. ON LABEL, ITEM 17. SEE DETAIL A.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.

FOR PARTS LIST SEE PL193-7301-2

PROPRIETARY NOTICE

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QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
			PARTS LIST			

	8311
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± ½°

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN HOPKINS	11/11/02
CHECKED	
ENGR. KNILL	12/02
ISSUED	

MCE/Weinschel Corporation

ASSY, ATTENUATOR UNIT,
MODEL 8311-1-6-F

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-7301-2	A

SCALE 1/2 SHEET 1 OF 1

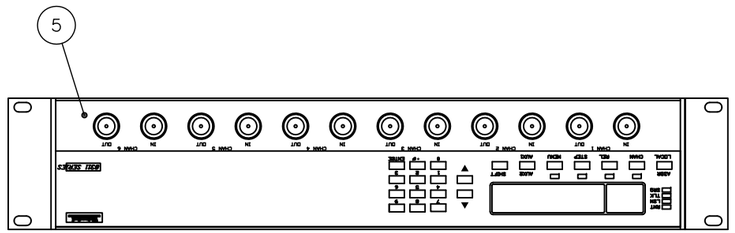
DWG. NO.	SH	REV.

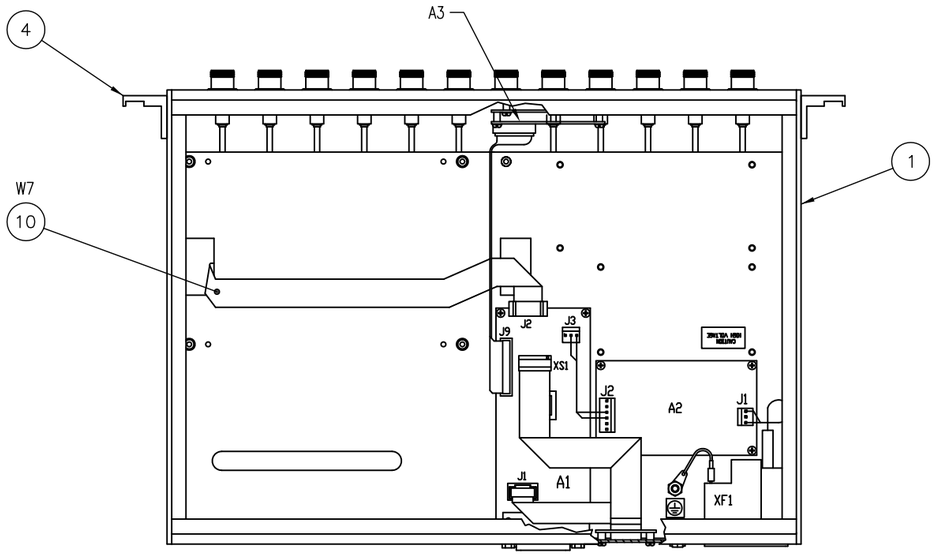
REVISIONS

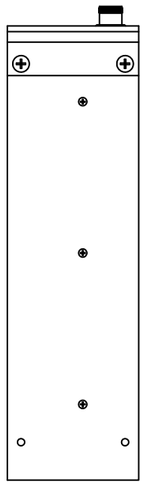
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-173 .	.	
	B	ECN 10-251 RS	AUG 10	

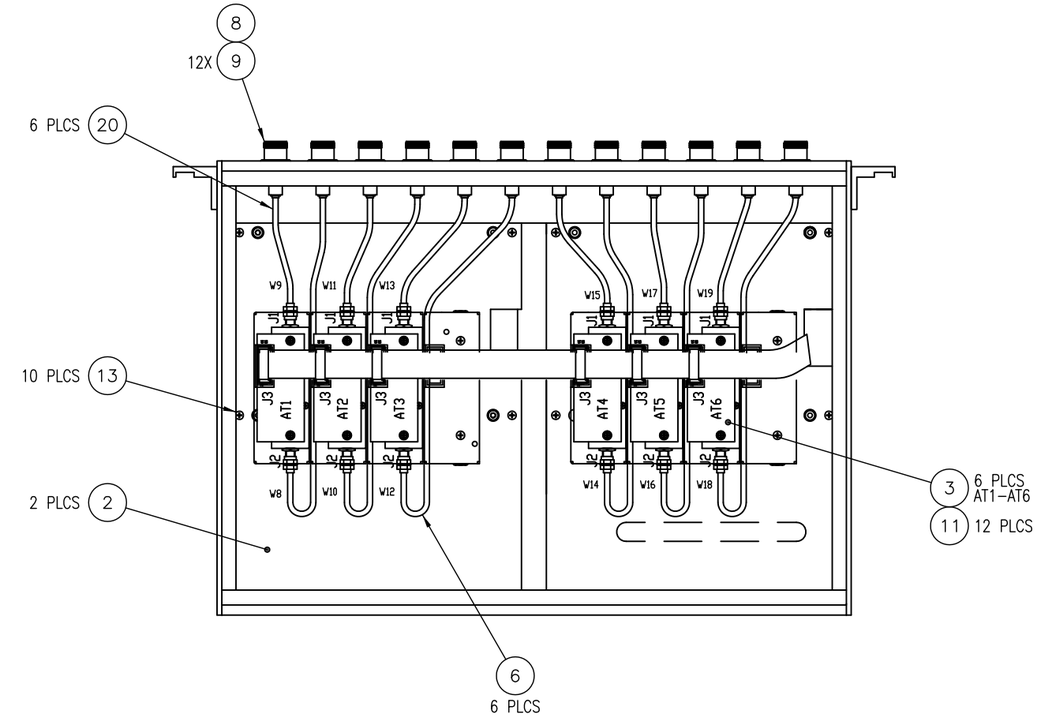
Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-38-6-F SERNO:XXX
FREQ:dc TO 2000 MHz
CHAN:6
ATTEN:63/1dB STEPS CE

DETAIL A

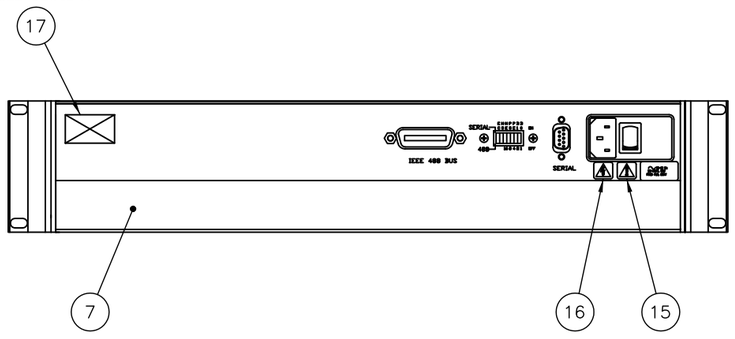








SEE DETAIL A



W19	AT6-J1	F/P CHAN 6 IN
W18	AT6-J2	F/P CHAN 6 OUT
W17	AT5-J1	F/P CHAN 5 IN
W16	AT5-J2	F/P CHAN 5 OUT
W15	AT4-J1	F/P CHAN 4 IN
W14	AT4-J2	F/P CHAN 4 OUT
W13	AT3-J1	F/P CHAN 3 IN
W12	AT3-J2	F/P CHAN 3 OUT
W11	AT2-J1	F/P CHAN 2 IN
W10	AT2-J2	F/P CHAN 2 OUT
W9	AT1-J1	F/P CHAN 1 IN
W8	AT1-J2	F/P CHAN 1 OUT
W7	A1-J2	AT1 THRU AT6
DES	FROM	TO

CABLE CHART

NOTES:

1. PERMANENTLY MARK NOMENCLATURE ON LABEL, ITEM 17. SEE DETAIL A.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.

FOR PARTS LIST SEE PL193-7302-2

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QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL .
FINISH .

.	8311
NEXT ASSY	USED ON
APPLICATION	

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN HOPKINS	11/11/02
CHECKED .	.
ENGR. KNILL	12/02
ISSUED	

AEROFLEX WEINSCHEL

ASSY, ATTENUATOR UNIT, MODEL 8311-38-6-F

SIZE D | CAGE: 93459 | DWG. NO. 193-7302-2 | REV. B
SCALE 1/2 | SHEET 1 OF 1

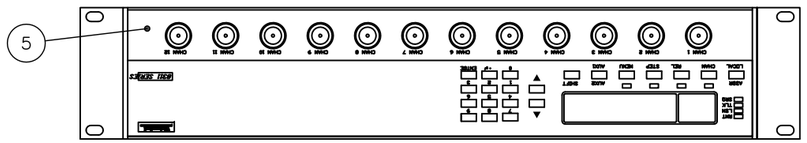
AUTOCAD V.2007

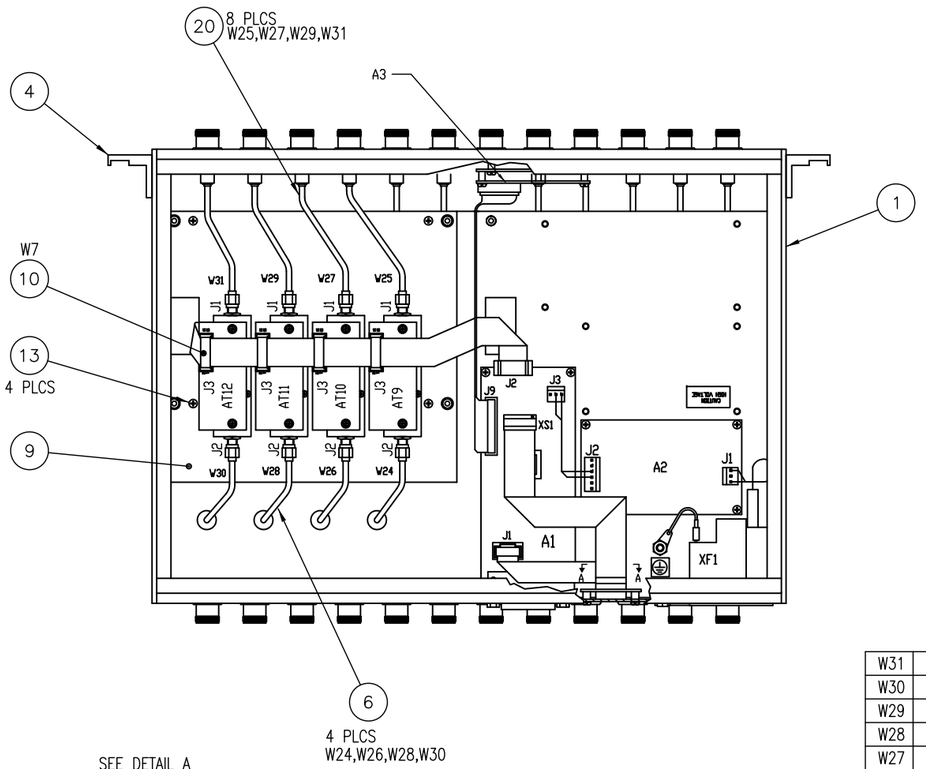
DWG. NO.	SH	REV.

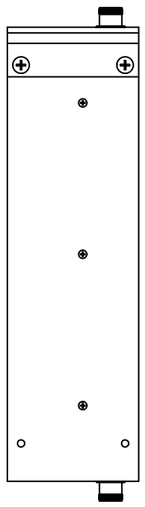
REVISIONS

ZONE	REV.	DESCRIPTION		DATE	APPROVED
	A	ERN 02-146	.	.	
	B	INC ECN 02-322	AH	10/22/02	
	C	ECN 04-119	GT	4-8-04	
	D	ECN 10-251	RS	AUG 10	

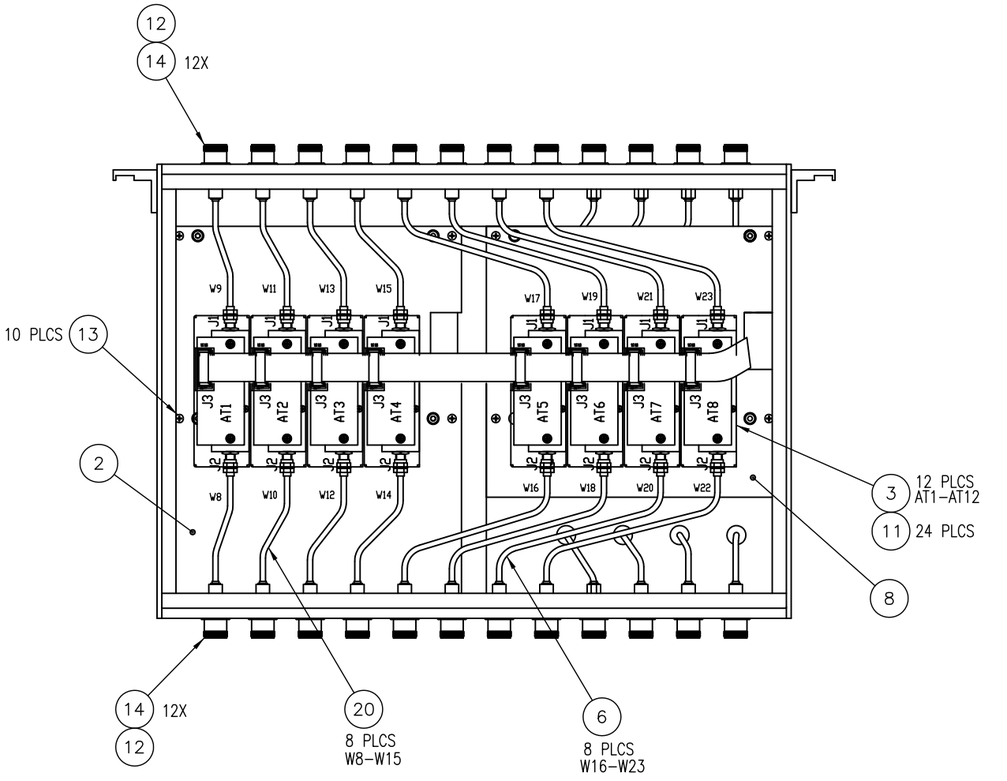
Aeroflex / Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-38-12-T SERNO:XXX
FREQ:dc TO 2000 MHz
CHAN:12
ATTEN:63/1dB STEPS

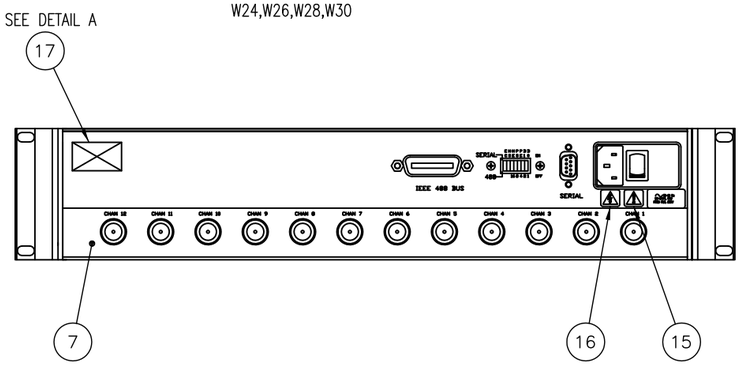






DETAIL A





W31	AT12-J1	F/P CHAN 12
W30	AT12-J2	R/P CHAN 12
W29	AT11-J1	F/P CHAN 11
W28	AT11-J2	R/P CHAN 11
W27	AT10-J1	F/P CHAN 10
W26	AT10-J2	R/P CHAN 10
W25	AT9-J1	F/P CHAN 9
W24	AT9-J2	R/P CHAN 9
W23	AT8-J1	F/P CHAN 8
W22	AT8-J2	R/P CHAN 8
W21	AT7-J1	F/P CHAN 7
W20	AT7-J2	R/P CHAN 7
W19	AT6-J1	F/P CHAN 6
W18	AT6-J2	R/P CHAN 6
W17	AT5-J1	F/P CHAN 5
W16	AT5-J2	R/P CHAN 5
W15	AT4-J1	F/P CHAN 4
W14	AT4-J2	R/P CHAN 4
W13	AT3-J1	F/P CHAN 3
W12	AT3-J2	R/P CHAN 3
W11	AT2-J1	F/P CHAN 2
W10	AT2-J2	R/P CHAN 2
W9	AT1-J1	F/P CHAN 1
W8	AT1-J2	R/P CHAN 1
W7	A1-J2	AT1 THRU AT12
DES	FROM	TO

CABLE CHART

NOTES:
1. PERMANENTLY MARK NOMENCLATURE ON LABEL, ITEM 17. SEE DETAIL A.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.

FOR PARTS LIST SEE PL193-7302-8

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

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TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

AEROFLEX WEINSCHEL

APPROVALS	DATE
DRAWN HOPKINS	9/17/02
CHECKED .	.
ENGR. KNILL	9/02
ISSUED	

ASSY, ATTENUATOR UNIT, MODEL 8311-38-12-T

.	8311
NEXT ASSY	USED ON
APPLICATION	

MATERIAL .
FINISH .
DO NOT SCALE DRAWING

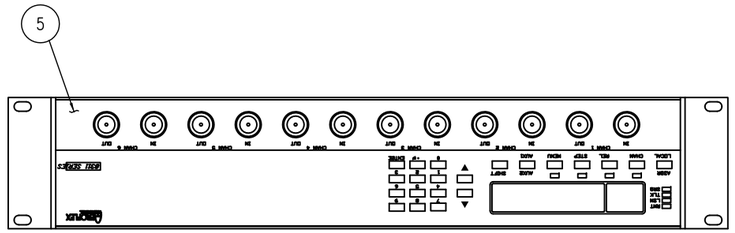
SIZE D | CAGE: 93459 | DWG. NO. 193-7302-8 | REV. D
SCALE 1/2 | SHEET 1 OF 1

AUTOCAD V.2007

DWG. NO.	SH	REV.

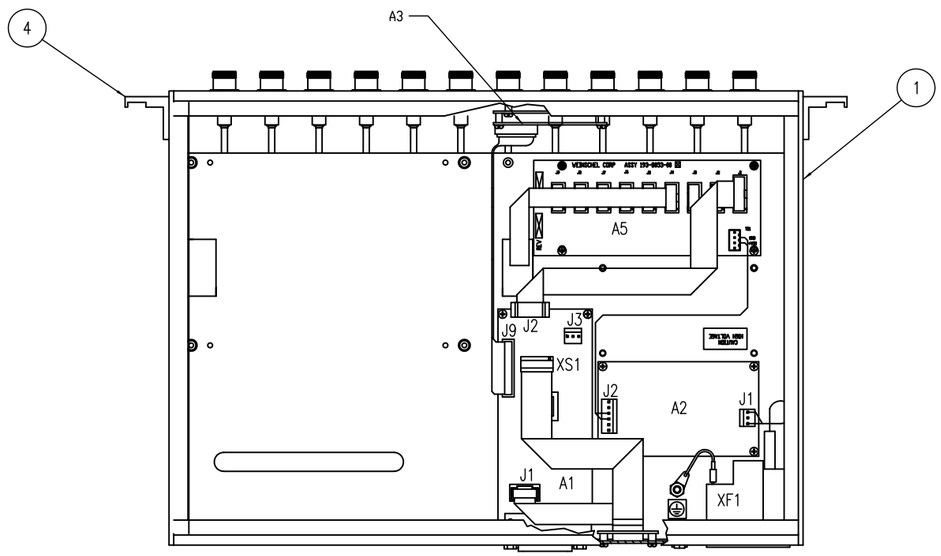
REVISIONS

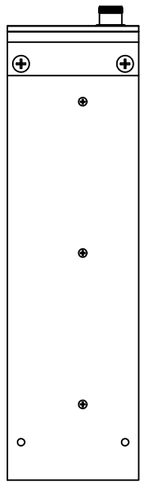
ZONE	REV.	DESCRIPTION		DATE	APPROVED
	A	ERN 02-173	.	.	
	B	ECN 04-032	RS	02-04	
	C	ECN 09-064	VB	02/09	
	D	ECN 10-251	RS	AUG 10	

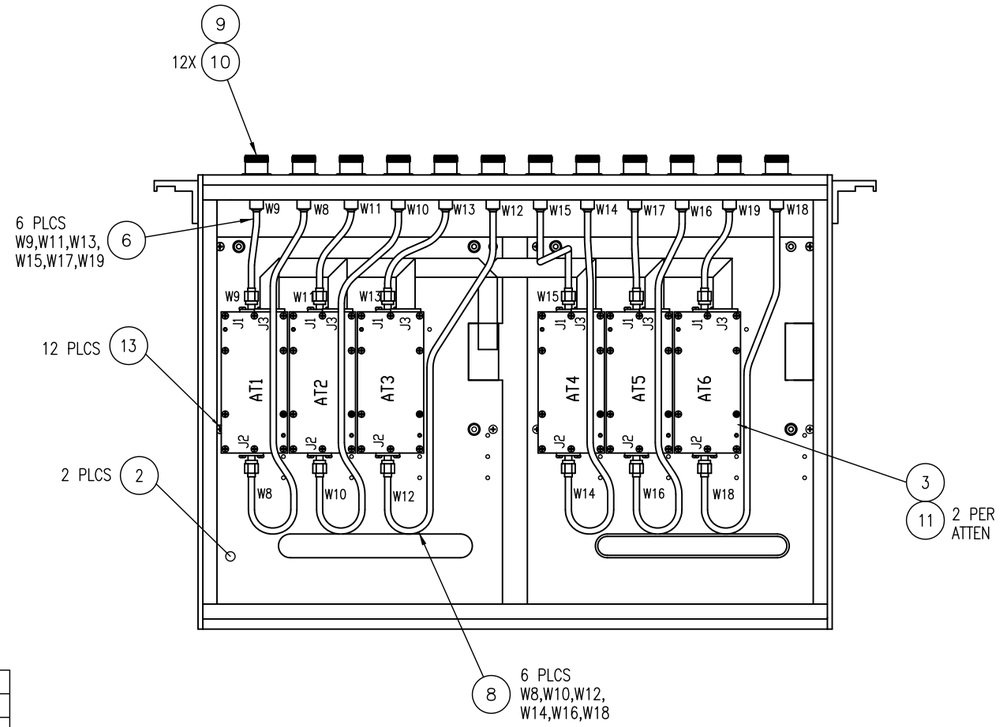


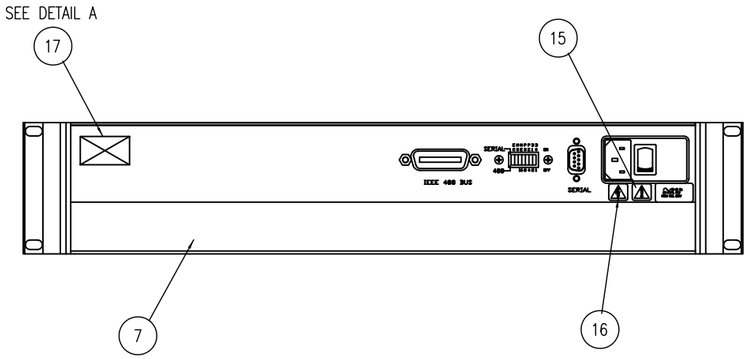
Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-137-6-F SERNO:
FREQ: .8-3.0 GHz
CHAN: 6
ATTEN: 63/1dB STEPS CE

DETAIL A









W25	A5-J9	AT1-J3
W24	A5-J8	AT2-J3
W23	A5-J7	AT3-J3
W22	A5-J6	AT6-J3
W21	A5-J5	AT5-J3
W20	A5-J4	AT4-J3
W19	AT6-J1	F/P CHAN 6 IN
W18	AT6-J2	F/P CHAN 6 OUT
W17	AT5-J1	F/P CHAN 5 IN
W16	AT5-J2	F/P CHAN 5 OUT
W15	AT4-J1	F/P CHAN 4 IN
W14	AT4-J2	F/P CHAN 4 OUT
W13	AT3-J1	F/P CHAN 3 IN
W12	AT3-J2	F/P CHAN 3 OUT
W11	AT2-J1	F/P CHAN 2 IN
W10	AT2-J2	F/P CHAN 2 OUT
W9	AT1-J1	F/P CHAN 1 IN
W8	AT1-J2	F/P CHAN 1 OUT
DES	FROM	TO

CABLE CHART

NOTES:

1. PERMANENTLY MARK MODEL NO., CHANNEL NO. & SERIAL NO. ON LABEL, ITEM 17. SEE DETAIL A.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.

FOR PARTS LIST SEE PL193-7303-2

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

AEROFLEX WEINSCHEL

APPROVALS	DATE
DRAWN HOPKINS	12/02
CHECKED .	.
ENGR. KNILL	12/02
ISSUED	

ASSY, ATTENUATOR UNIT,
MODEL 8311-137-6-F

.	8311
NEXT ASSY	USED ON
APPLICATION	

MATERIAL .
FINISH .
DO NOT SCALE DRAWING

SIZE D | CAGE: 93459 | DWG. NO. 193-7303-2 | REV. D
SCALE 1/2 | SHEET 1 OF 1

AUTOCAD V.2007

DWG. NO.	SH	REV.

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
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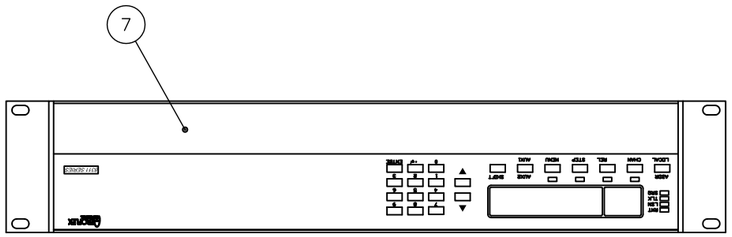
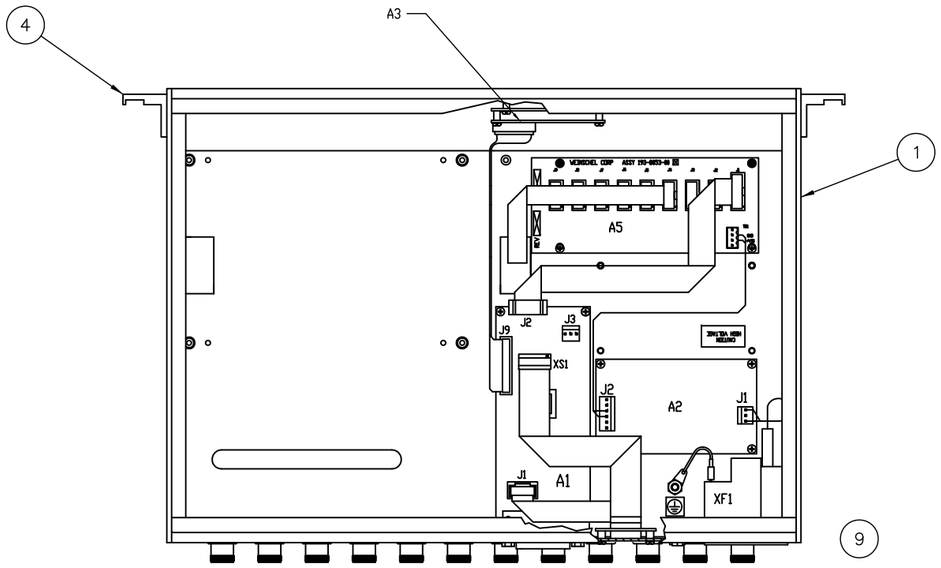
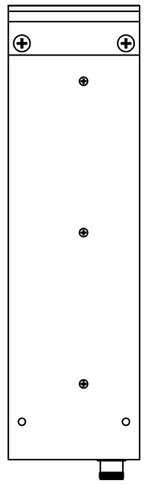
	B	ECN 09-063 VB.	02/09	
	C	ECN 10-251 RS	AUG 10	

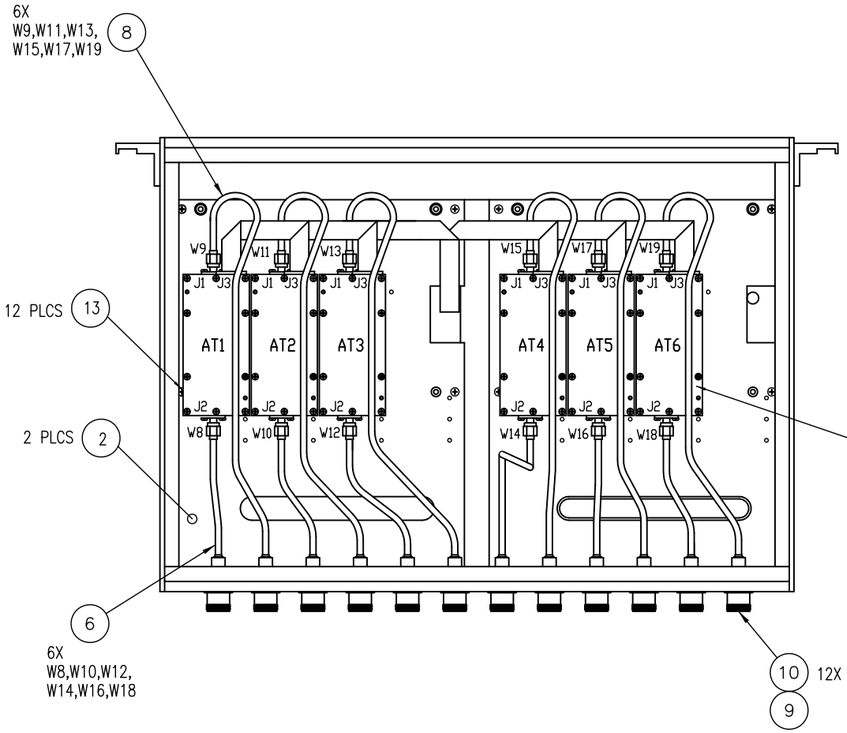


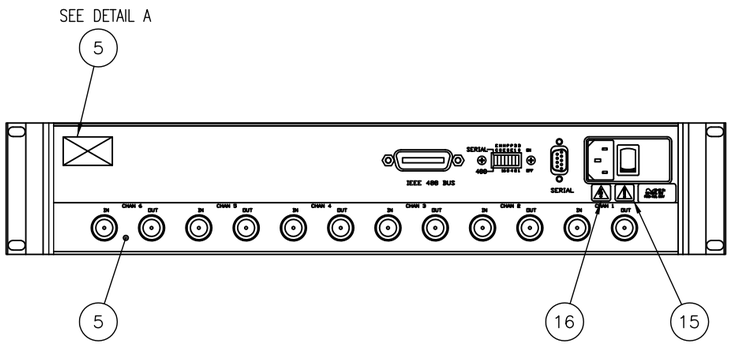




Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-137-6-R SERNO:
FREQ: .8-3.0 GHz
CHAN: 6
ATTEN: 63/1dB STEPS CE

DETAIL A





W25	A5-J9	AT1-J3
W24	A5-J8	AT2-J3
W23	A5-J7	AT3-J3
W22	A5-J6	AT6-J3
W21	A5-J5	AT5-J3
W20	A5-J4	AT4-J3
W19	AT6-J1	R/P CHAN 6 IN
W18	AT6-J2	R/P CHAN 6 OUT
W17	AT5-J1	R/P CHAN 5 IN
W16	AT5-J2	R/P CHAN 5 OUT
W15	AT4-J1	R/P CHAN 4 IN
W14	AT4-J2	R/P CHAN 4 OUT
W13	AT3-J1	R/P CHAN 3 IN
W12	AT3-J2	R/P CHAN 3 OUT
W11	AT2-J1	R/P CHAN 2 IN
W10	AT2-J2	R/P CHAN 2 OUT
W9	AT1-J1	R/P CHAN 1 IN
W8	AT1-J2	R/P CHAN 1 OUT
DES	FROM	TO

CABLE CHART

NOTES:

1. PERMANENTLY MARK MODEL NO., CHANNEL NO. & SERIAL NO. ON LABEL, ITEM 17. SEE DETAIL A.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.

FOR PARTS LIST SEE PL193-7303-12

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

PROPRIETARY NOTICE
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.	8311
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL .
FINISH .
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN R.SHOCK	02-04
CHECKED .	.
ENGR. KNILL	02-04
ISSUED	

AEROFLEX WEINSCHEL

ASSY, ATTENUATOR UNIT, MODEL 8311-137-6-R

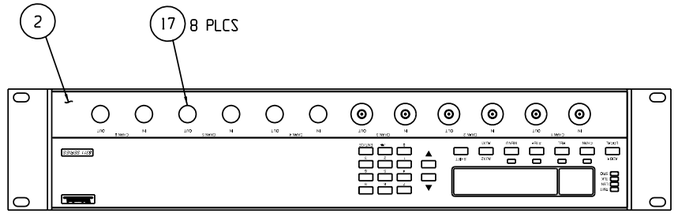
SIZE	CAGE:	DWG. NO.	REV.
D	93459	193-7303-12	C

SCALE 1/2 SHEET 1 OF 1

AUTOCAD V.2007

DWG. NO.	SH 1	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-136		
	B	INC ECN 03-007 AH	1/6/03	
	C	ECN 04-026 RS	01-04	
	D	ECN 05-297 RS	10-05	

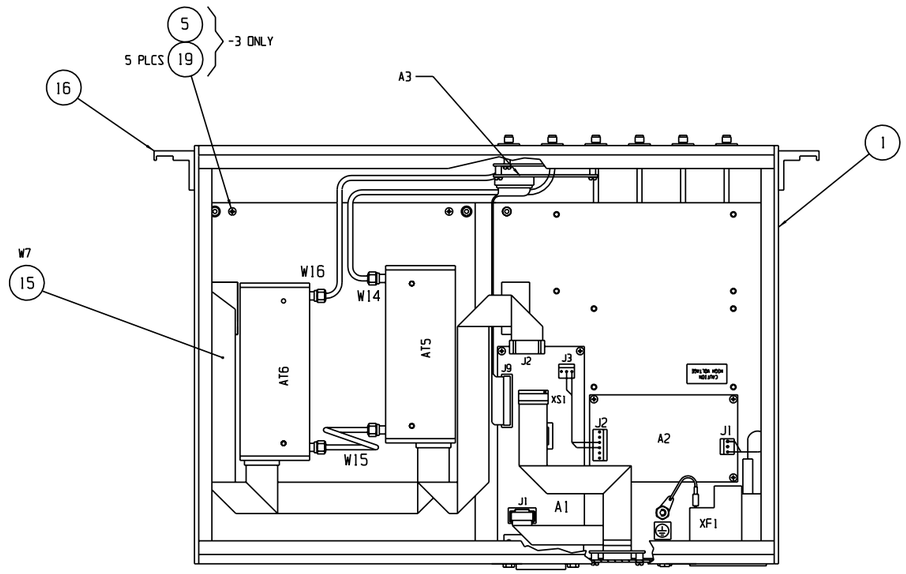


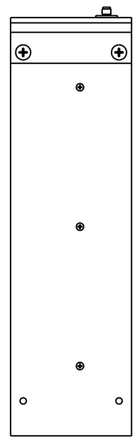
W16	AT6	CHAN 3 OUT	ITEM 13
W15	AT5	AT6	ITEM 11
W14	CHAN 3 IN	AT5	ITEM 13
W13	AT4	CHAN 2 OUT	ITEM 13
W12	AT3	AT4	ITEM 11
W11	CHAN 2 IN	AT3	ITEM 13
W10	AT2	CHAN 1 OUT	ITEM 12
W9	AT1	AT2	ITEM 11
W8	CHAN 1 IN	AT1	ITEM 12
W7	A1-J2	AT1 THRU AT6	ITEM 15
DES	FROM	TO	REMARKS

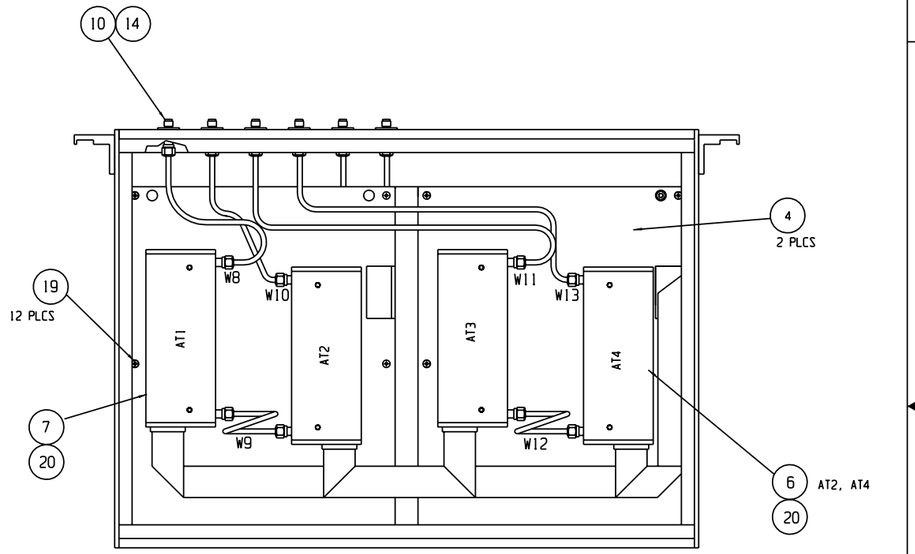
CABLE CHART
193-7305-3

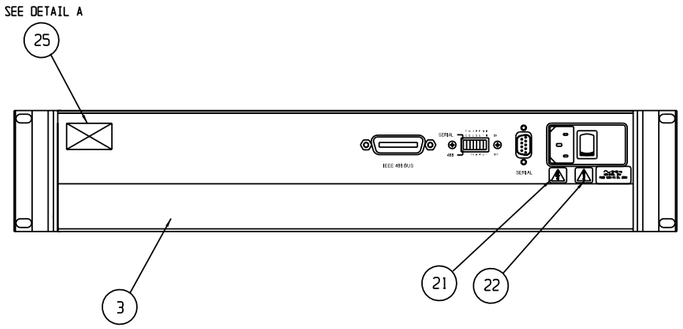
W13	AT4	CHAN 2 OUT	ITEM 13
W12	AT3	AT4	ITEM 11
W11	CHAN 2 IN	AT3	ITEM 13
W10	AT2	CHAN 1 OUT	ITEM 12
W9	AT1	AT2	ITEM 11
W8	CHAN 1 IN	AT1	ITEM 12
W7	A1-J2	AT1 THRU AT4	ITEM 15
DES	FROM	TO	REMARKS

CABLE CHART
193-7305-2









Aeroflex / Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL: SERNO:
FREQ: dc to 18GHz
CHAN: X
ATTEN: 121/1dB STEPS

DETAIL A

1

NOTES:

1. PERMANENTLY MARK MODEL NUMBER, SERIAL NUMBER AND NUMBER OF CHANNELS ON LABEL, ITEM 25. SEE DETAIL A.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.

8311-202-3-F 8311-202-2-F	193-7305-3 193-7305-2
MODEL NUMBER	PARTS LIST

PARTS LIST

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PROPRIETARY NOTICE
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .005 ANGLES ± 1/2°

CONTRACT NO.

Aeroflex / Weinschel

APPROVALS	DATE
DRAWN B. KNILL	8-02
CHECKED	
ENGR. KNILL	8-02
ISSUED	

ASSY, ATTENUATOR UNIT,
MODEL 8311-202-X-F

MATERIAL
FINISH
DO NOT SCALE DRAWING

NEXT ASSY	USED ON
	8311-202-2-F
APPLICATION	

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-7305-2, -3	D

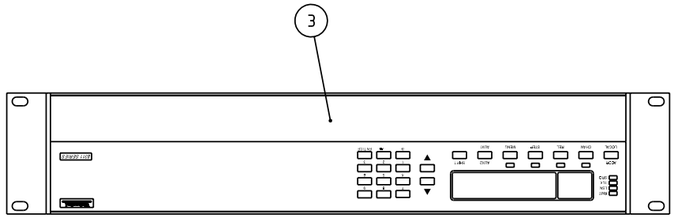
SCALE 1/2 SHEET 1 OF 1

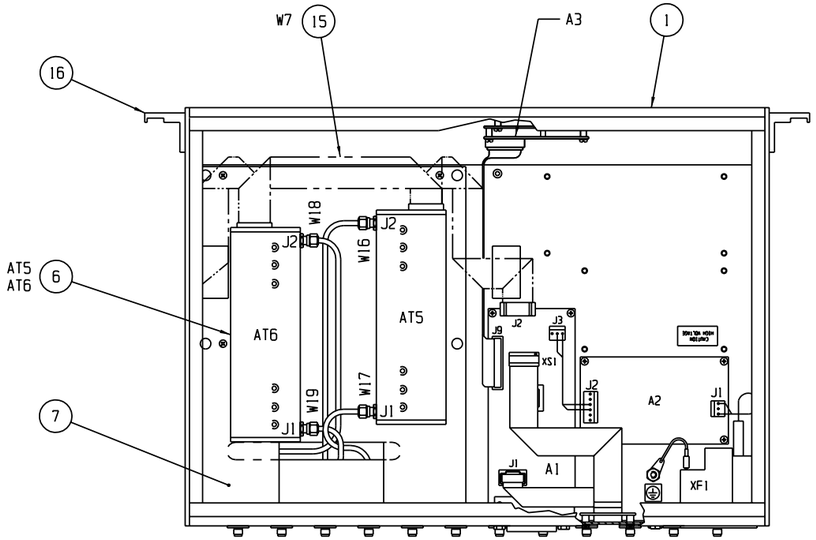
DWG. NO.	SH 1	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 06-021 R.S.	02-06	

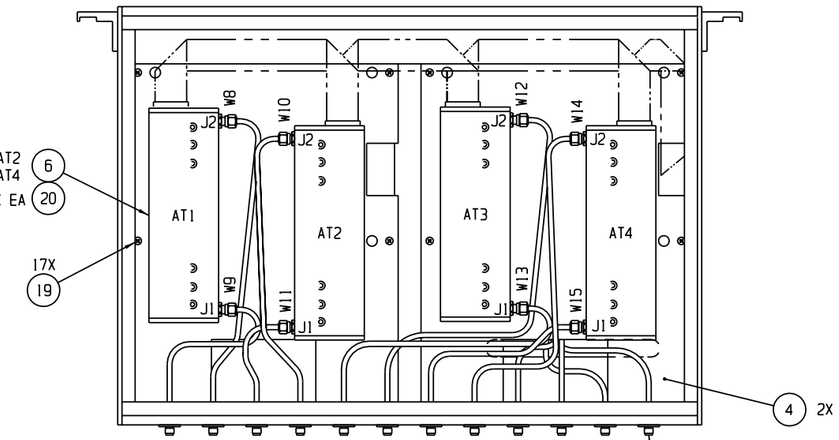
NOTES: UNLESS OTHERWISE SPECIFIED.

1. PERMANENTLY MARK NOMENCLATURE ON LABEL, ITEM 17. SEE VIEW A.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.





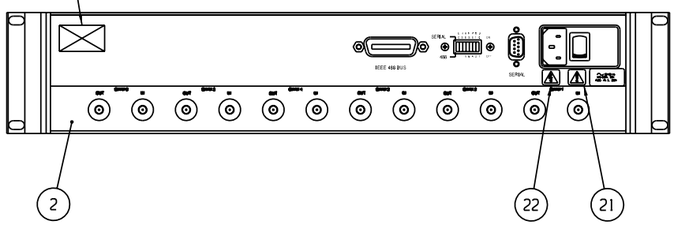
TOP VIEW



BOTTOM VIEW

Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-204-6-R SERNO:XXXX
FREQ:dc to 18GHz
CHAN:6
ATTEN:62/2dB STEPS CE

VIEW A



W19	CHAN 6 IN	AT6-J1	ITEM 10
W18	CHAN 6 OUT	AT6-J2	ITEM 13
W17	CHAN 5 IN	AT5-J1	ITEM 10
W16	CHAN 5 OUT	AT5-J2	ITEM 12
W15	CHAN 4 IN	AT4-J1	ITEM 10
W14	CHAN 4 OUT	AT4-J2	ITEM 12
W13	CHAN 3 IN	AT3-J1	ITEM 11
W12	CHAN 3 OUT	AT3-J2	ITEM 13
W11	CHAN 2 IN	AT2-J1	ITEM 9
W10	CHAN 2 OUT	AT2-J2	ITEM 11
W9	CHAN 1 IN	AT1-J1	ITEM 9
W8	CHAN 1 OUT	AT1-J2	ITEM 11
W7	A1-J2	AT1 THRU AT6	ITEM 15
DES	FROM	TO	REMARKS

CABLE CHART

PROPRIETARY NOTICE
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FOR PARTS LIST SEE PL193-7304-12

QTY 6000	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
PARTS LIST						

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS XX ± .01 XXX ± .005 ANGLES ± 1/2°

CONTRACT NO.

APPROVALS	DATE
DRAWN R. SHOCK	02-06
CHECKED A. HOPKINS	02-06
ENGR. B. KNILL	02-06
ISSUED	

Aeroflex / Weinschel

ASSY, ATTENUATOR UNIT, MODEL 8311-204-6-R

NEXT ASSY	USED ON
	8311-204-6-R

APPLICATION

MATERIAL

FINISH

DO NOT SCALE DRAWING

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-7304-12	A

SCALE 1/2 SHEET 1 OF 1

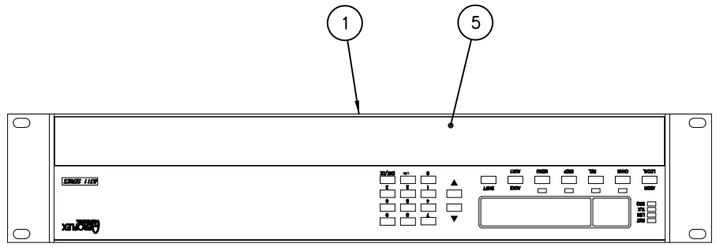
DWG. NO.	SH	REV.

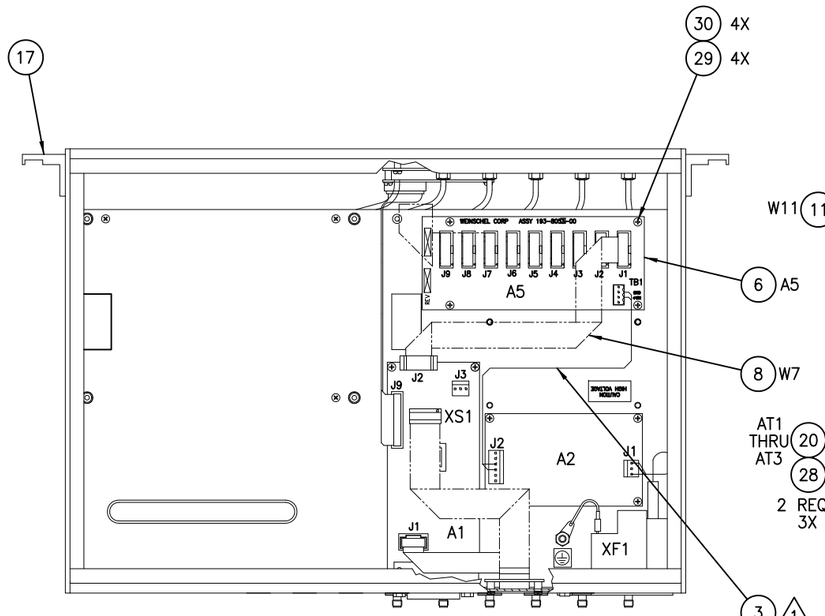
REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 08-082 VB.	06/08	

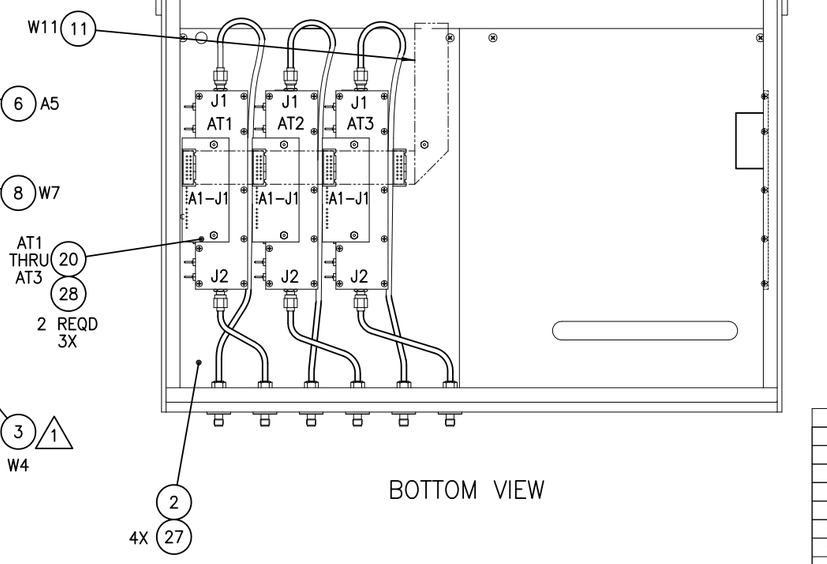
NOTES:

1. RETURN CABLE P/N 193-9176 TO STOCK. REPLACE WITH ITEM 3 P/N 193-9664.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.
3. PERMANENTLY MARK MODEL NO., SERIAL NO. & NO. OF CHANNELS ON LABEL, ITEM 18, SEE DETAIL A.





TOP VIEW

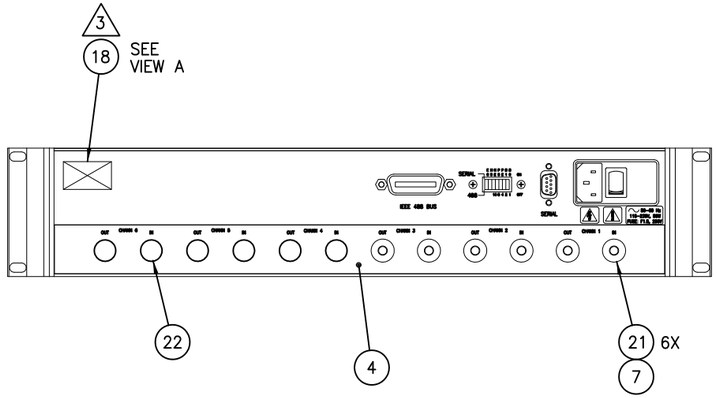


BOTTOM VIEW

W17	AT3-J1	CHAN 3 (IN)
W18	AT3-J2	CHAN 3 (OUT)
W15	AT2-J1	CHAN 2 (IN)
W16	AT2-J2	CHAN 2 (OUT)
W13	AT1-J1	CHAN 1 (IN)
W14	AT1-J2	CHAN 1 (OUT)
W12	-	-
W11	AT1(A1-J1) THRU AT3(A1-J1)	A5-J8
W7	A1-J2	A5-J2
W4	A2-J2	A5-TB1
DES	FROM	TO

Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-352-3-R SERNO:
FREQ: DC TO 6.0 GHz
CHAN: 3
ATTEN: 103/1dB STEPS

VIEW A



FOR PARTS LIST SEE PL193-7306-13

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

APPROVALS		DATE
DRAWN	V. BETSIS	06/08
CHECKED	A. HOPKINS	06/08
ENGR.	W. KNILL	06/08
ISSUED		

MATERIAL

FINISH

DO NOT SCALE DRAWING

Aeroflex / Weinschel

ATTEN UNIT
3 CHANNEL

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-7306-13	A

SCALE 1 : 2 SHEET 1 OF 1

8311-352-3-R	
NEXT ASSY	USED ON
APPLICATION	

PROPRIETARY NOTICE
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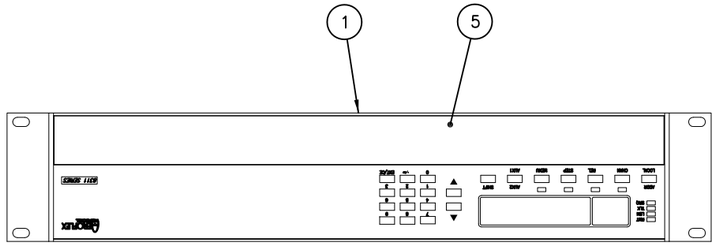
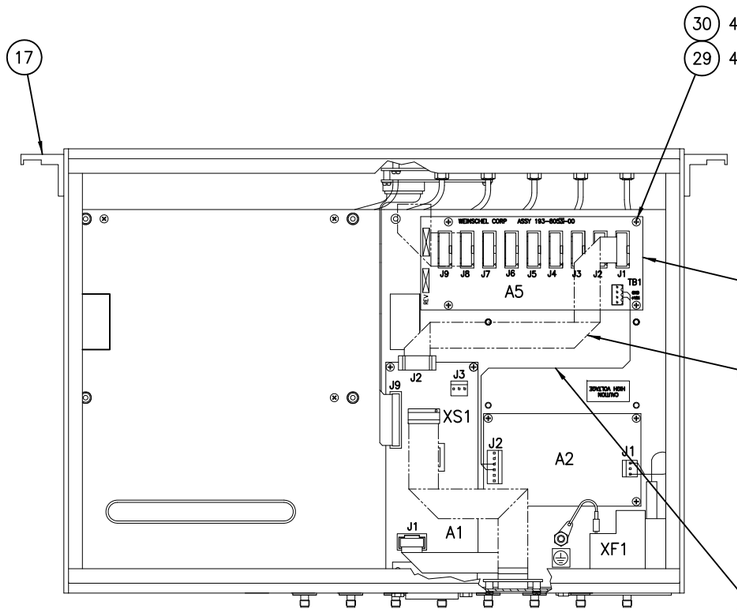
DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 10-024 VB.	02/10	
	B	ECN 10-101 VB.	04/10	

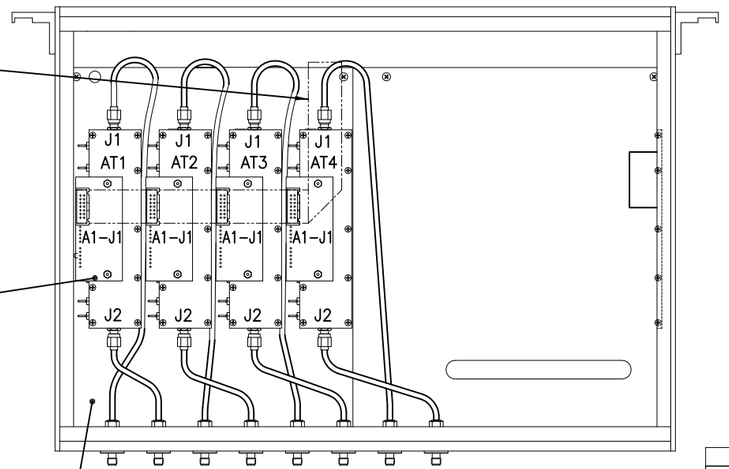


NOTES:

1. RETURN CABLE P/N 193-9176 TO STOCK. REPLACE WITH ITEM 3 P/N 193-9664.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.
3. PERMANENTLY MARK MODEL NO., SERIAL NO. & NO. OF CHANNELS ON LABEL, ITEM 18, SEE DETAIL A.
4. USE SPIRAL WRAP, PN 079R-198-1, ON CABLES W13, W15, W17, W19, TO PREVENT SHORTS TO FEED THRU TERMINALS OF ATTENUATORS.



TOP VIEW

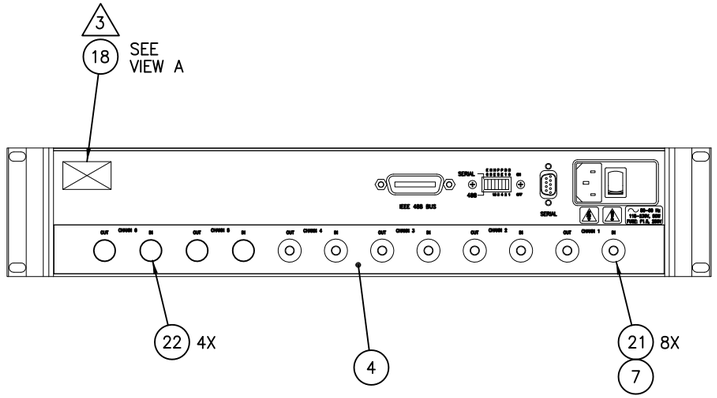


BOTTOM VIEW

W20	AT4-J2	CHAN 4 (OUT)
W19	AT4-J1	CHAN 4 (IN)
W18	AT3-J2	CHAN 3 (OUT)
W17	AT3-J1	CHAN 3 (IN)
W16	AT2-J2	CHAN 2 (OUT)
W15	AT2-J1	CHAN 2 (IN)
W14	AT1-J2	CHAN 1 (OUT)
W13	AT1-J1	CHAN 1 (IN)
–	–	–
W11	AT1-A1-J1 THRU AT4-A1-J1	A5-J8
W7	A1-J2	A5-J2
W4	A2-J2	A5-TB1
DES	FROM	TO

Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-352-4-R SERNO:
FREQ: DC TO 6.0 GHz
CHAN: 4
ATTEN: 103/1dB STEPS

VIEW A



FOR PARTS LIST SEE PL193-7306-14

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
PARTS LIST						

PROPRIETARY NOTICE

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	8311-352-4-R
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

APPROVALS	DATE
DRAWN V. BETSIS	02/10
CHECKED A. HOPKINS	02/10
ENGR. W. KNILL	02/10
ISSUED	

MATERIAL
FINISH
DO NOT SCALE DRAWING

Aeroflex / Weinschel

ATTEN UNIT
4 CHANNEL

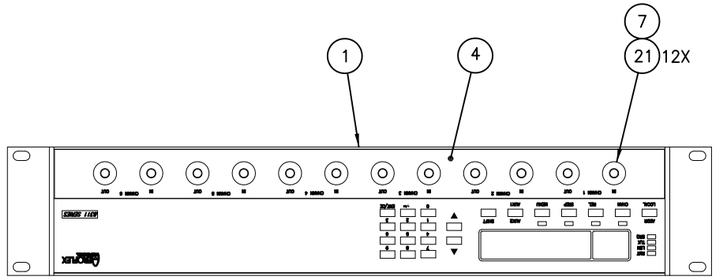
SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-7306-14	B

SCALE 1 : 2 SHEET 1 OF 1

DWG. NO.	SH	REV.

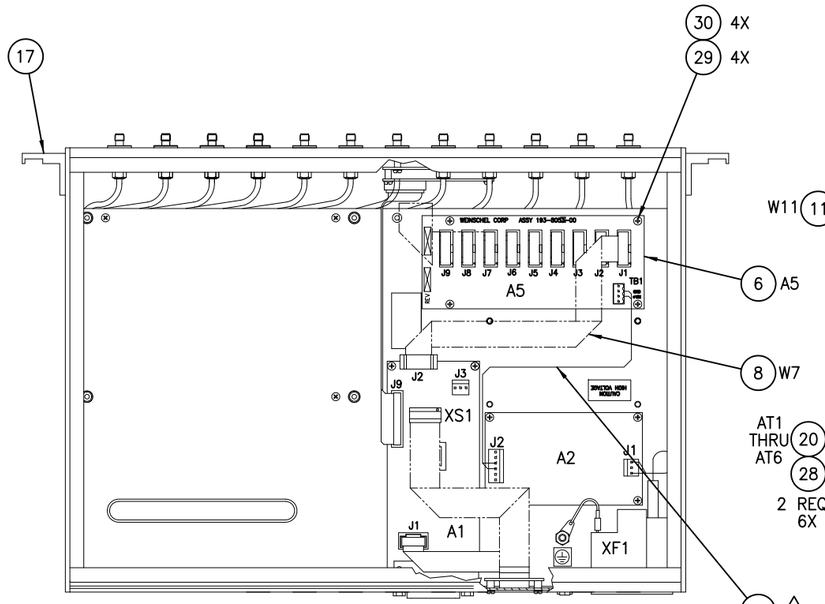
REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 06-083 EC	6/21/06	
	B	ECN 08-087 MT	2/08	

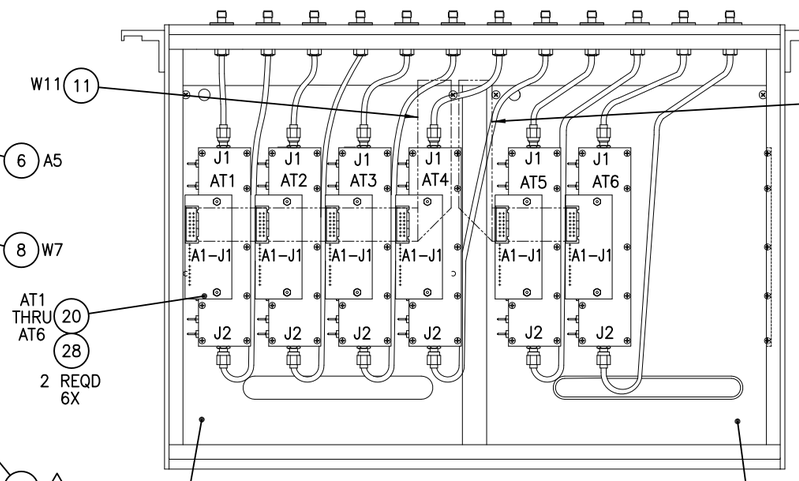


NOTES:

1. RETURN CABLE P/N 193-9176 TO STOCK. REPLACE WITH ITEM 3 P/N 193-9664.
2. AFTER ASSEMBLY, CONFIGURE AND TEST.
3. PERMANENTLY MARK MODEL NO., SERIAL NO. & NO. OF CHANNELS ON LABEL, ITEM 18, SEE DETAIL A.



TOP VIEW

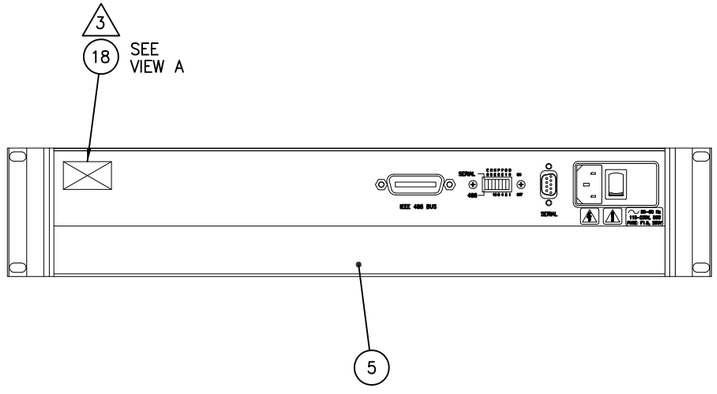


BOTTOM VIEW

W24	AT6-J2	CHAN 6 (OUT)
W23	AT6-J1	CHAN 6 (IN)
W22	AT5-J2	CHAN 5 (OUT)
W21	AT5-J1	CHAN 5 (IN)
W20	AT4-J1	CHAN 4 (OUT)
W19	AT4-J1	CHAN 4 (IN)
W18	AT3-J2	CHAN 3 (OUT)
W17	AT3-J1	CHAN 3 (IN)
W16	AT2-J2	CHAN 2 (OUT)
W15	AT2-J1	CHAN 2 (IN)
W14	AT1-J2	CHAN 1 (OUT)
W13	AT1-J1	CHAN 1 (IN)
W12	AT5-A1-J1 THRU AT6-A1-J1	A5-J7
W11	AT1-A1-J1 THRU AT4-A1-J1	A5-J8
W7	A1-J2	A5-J2
DES	FROM	TO

Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-352-6-F SERNO:
FREQ: DC TO 6.0 GHz
CHAN: 6
ATTEN: 103/1dB STEPS

VIEW A



FOR PARTS LIST SEE PL193-7306-2

ITEM NO.	QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE
PARTS LIST						

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

APPROVALS	DATE
DRAWN E.CHEVINSKY	6/21/06
CHECKED	
ENGR.	
ISSUED	

Aeroflex / Weinschel

ATTEN UNIT
6 CHANNEL

MATERIAL
FINISH
DO NOT SCALE DRAWING

NEXT ASSY	USED ON
	8311-352-6-F

APPLICATION

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-7306-2	B

SCALE 1 : 2 SHEET 1 OF 1

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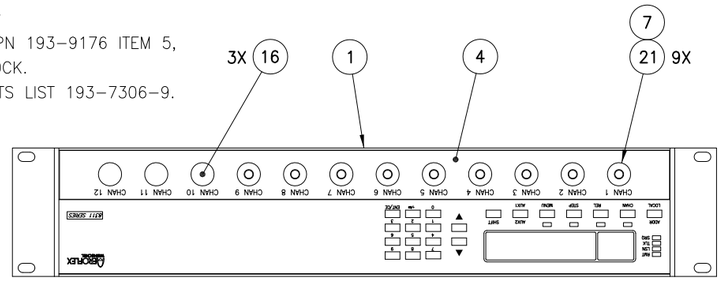
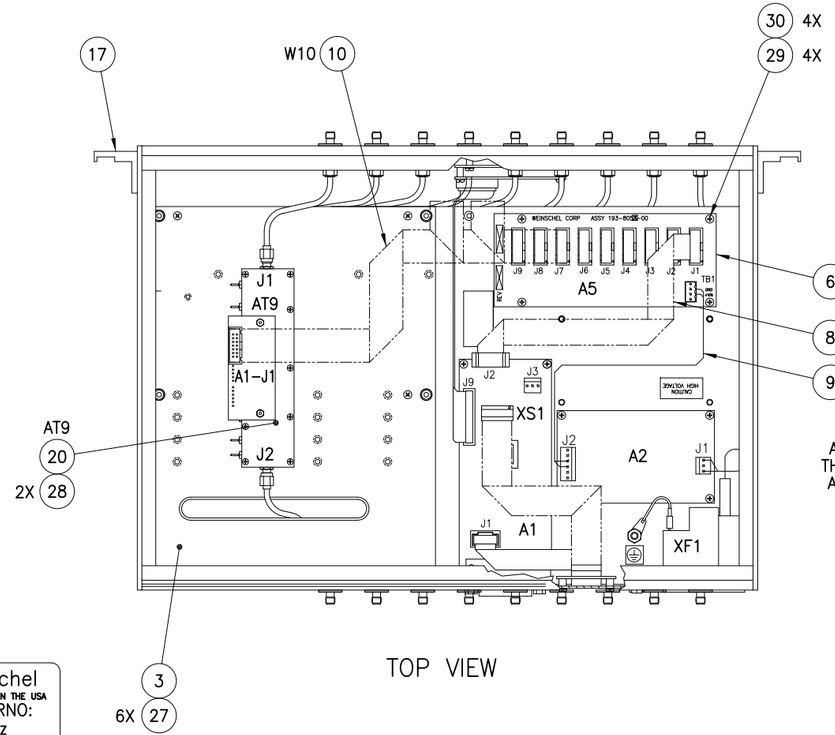
DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 05-194 R.S.	12-05	
	B	ECN 06-051 R.S.	02-06	
	C	ECN 07-293 R.S.	15 OCT 07	

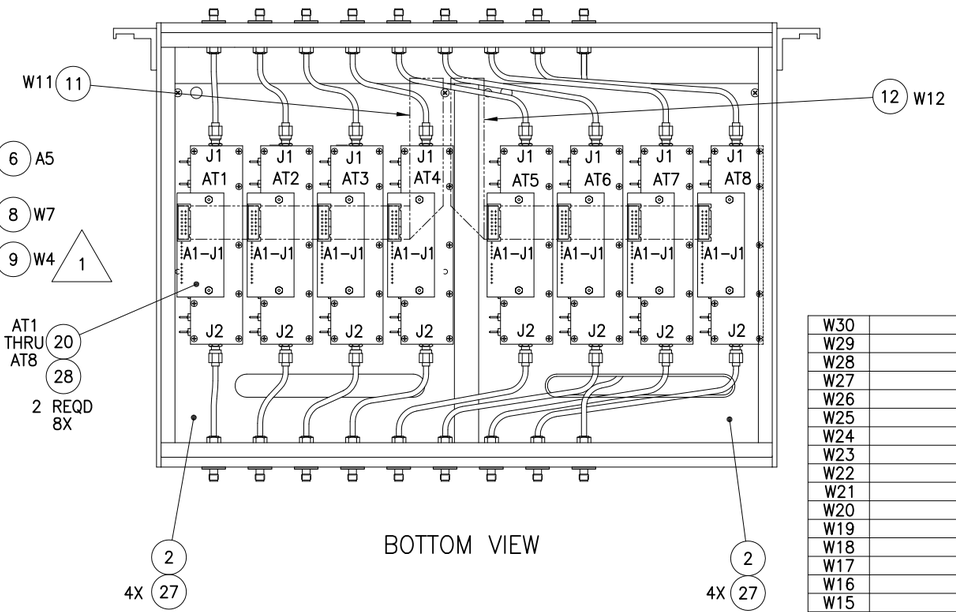
NOTES: UNLESS OTHERWISE SPECIFIED.

1. REMOVE AND RETURN CABLE W4 PN 193-9176 ITEM 5, ON 193-8051 BASE ASSY TO STOCK. REPLACE CABLE WITH ITEM 9 PARTS LIST 193-7306-9.





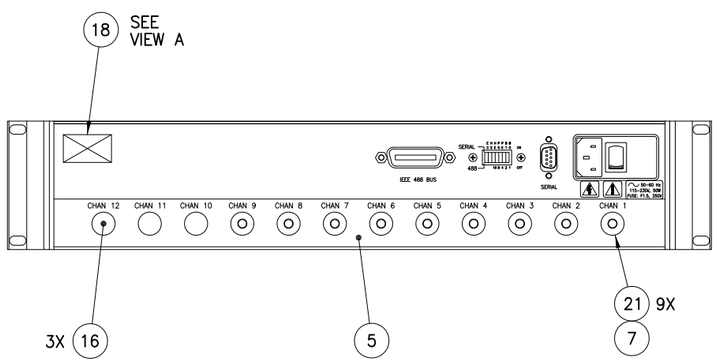
TOP VIEW



BOTTOM VIEW

Aeroflex/Weinschel
CAGE CODE 93459 MADE IN THE USA
MODEL:8311-352-9-T SERNO:
FREQ: DC TO 6.0 GHz
CHAN: 9
ATTEN: 103/1dB STEPS

VIEW A



W30	AT9-J2	CHAN 9 (REAR PNL)	
W29	AT8-J2	CHAN 8 (REAR PNL)	
W28	AT7-J2	CHAN 7 (REAR PNL)	
W27	AT6-J2	CHAN 6 (REAR PNL)	
W26	AT5-J2	CHAN 5 (REAR PNL)	
W25	AT4-J2	CHAN 4 (REAR PNL)	
W24	AT3-J2	CHAN 3 (REAR PNL)	
W23	AT2-J2	CHAN 2 (REAR PNL)	
W22	AT1-J2	CHAN 1 (REAR PNL)	
W21	AT9-J1	CHAN 9 (FNT PNL)	
W20	AT8-J1	CHAN 8 (FNT PNL)	
W19	AT7-J1	CHAN 7 (FNT PNL)	
W18	AT6-J1	CHAN 6 (FNT PNL)	
W17	AT5-J1	CHAN 5 (FNT PNL)	
W16	AT4-J1	CHAN 4 (FNT PNL)	
W15	AT3-J1	CHAN 3 (FNT PNL)	
W14	AT2-J1	CHAN 2 (FNT PNL)	
W13	AT1-J1	CHAN 1 (FNT PNL)	
W12	AT5-A1-J1 THRU AT8-A1-J1	A5-J7	
W11	AT1-A1-J1 THRU AT4-A1-J1	A5-J8	
W10	AT9-A1-J1	A5-J9	
W7	A1-J2	A5-J2	
W4	A2-J2	A5-TB1	
DES	FROM	TO	

FOR PARTS LIST SEE PL193-7306-9

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
PARTS LIST						

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

Aeroflex / Weinschel

APPROVALS		DATE
DRAWN	R. SHOCK	12-05
CHECKED	A. HOPKINS	12-05
ENGR.	B. KNILL	12-05
ISSUED		

ATTEN UNIT
9 CHANNEL

.	8311-352-9-T
NEXT ASSY	USED ON
APPLICATION	

MATERIAL .
FINISH .
DO NOT SCALE DRAWING

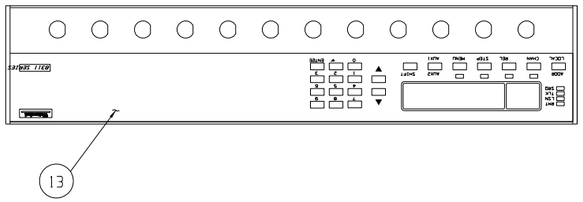
SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-7306-9	C

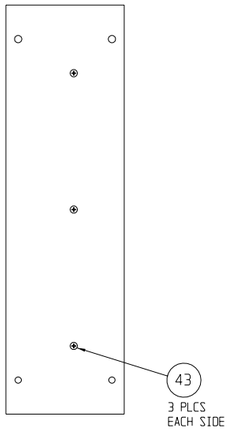
SCALE 1 : 2 SHEET 1 OF 1

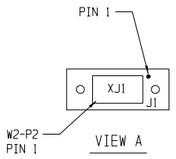
DWG. NO.	SH 1	REV.

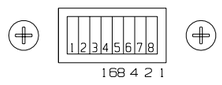
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 99-155		

WIRING CHART		
FROM	TO	COMMENTS
XF1	CHASSIS GROUND	W1
A1-XS1	R/P 488 ADRS	W2
A1-J2	R/P RS232	W3
A2-J2	A1-J3	W4
XF1	A2-J1	W5
A1-J9	A3-J1	W6





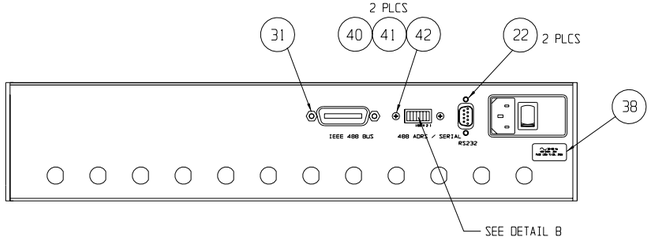




488 ADRS / SERIAL

DETAIL B

SCALE: 2/1



NOTES:

1. POWER CORD, ITEM 24, SUPPLIED BUT NOT SHOWN.

FOR PARTS LIST SEE PL193-8051

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

PROPRIETARY NOTICE

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	8311
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN G.THOMAS	10-12-99
CHECKED	
ENGR.	
ISSUED	

Weinschel Corporation

ASSY, ATTENUATOR UNIT, MODEL 8311

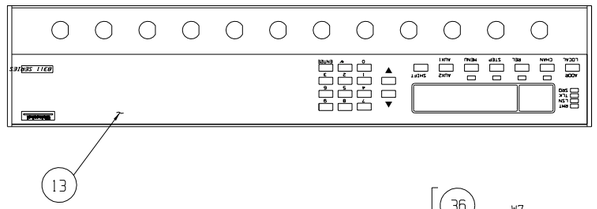
SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-8051	A

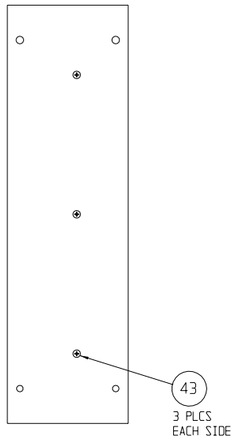
SCALE 1/2 SHEET 1 OF 1

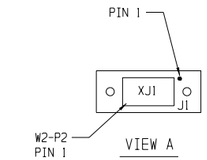
DWG. NO.	SH 1	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-173		

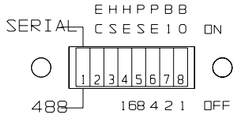
WIRING CHART		
FROM	TO	COMMENTS
XF1	CHASSIS GROUND	W1
A1-XS1	R/P 488 ADRS	W2
A1-J1	R/P RS232	W3
A2-J2	A5-TB1	W4
XF1	A2-J1	W5
A1-J9	A4-J1	W6
A1-J2	A5-J1	W7





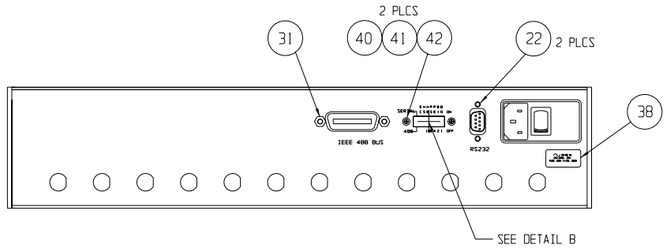


VIEW A



DETAIL B

SCALE: 2/1



NOTES:

1. POWER CORD, ITEM 24, SUPPLIED BUT NOT SHOWN.

FOR PARTS LIST SEE PL193-8051-1

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

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	8311
NEXT ASSY	USED ON
APPLICATION	

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TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN HOPKINS	12-02
CHECKED	
ENGR. KNILL	12-02
ISSUED	

MCE/Weinschel Corporation

ASSY, ATTENUATOR UNIT, BASE MODEL 8311 (+5V)

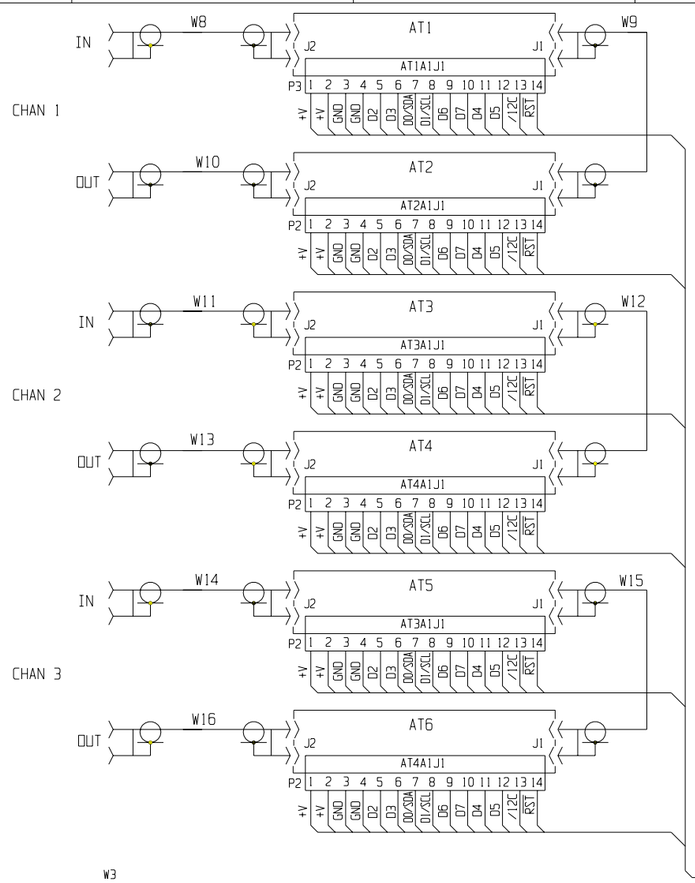
SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-8051-1	A

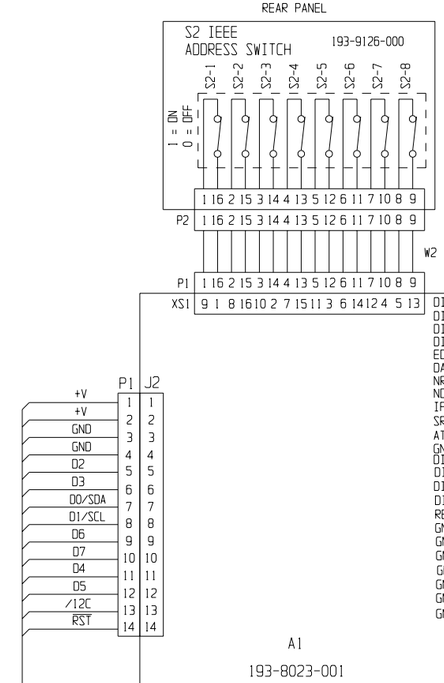
SCALE 1/2 SHEET 1 OF 1

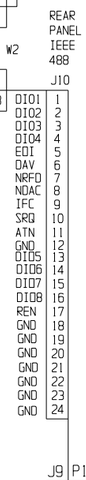
DWG. NO.	SH 1	REV.

REVISIONS

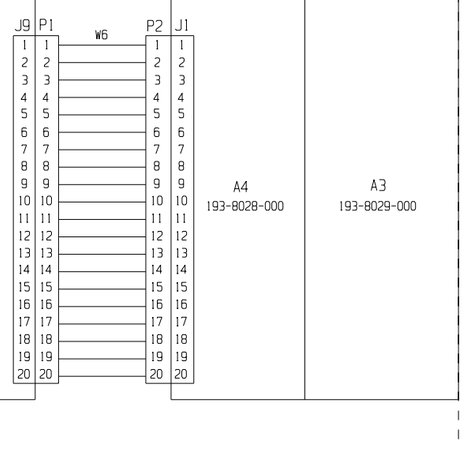
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-136		
	B	INC ECN 03-007 AH	1/6/03	

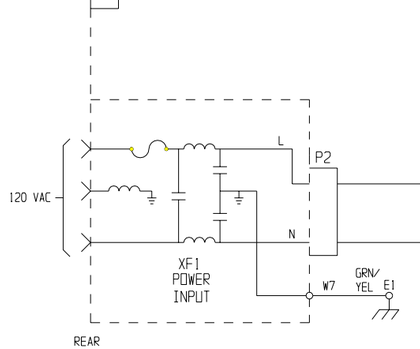


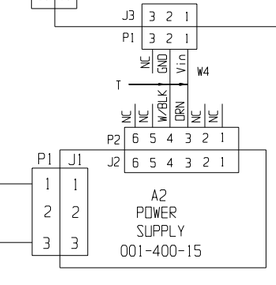




A1
193-8023-001







NOTES:

1. ATTENUATORS AT1 THROUGH AT6 AND RF CABLES W8 THRU W16 INSTALLED AS REQUIRED

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QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

193-7305-2	8311
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN B. KNILL	8/02
CHECKED	
ENGR. KNILL	8/02
ISSUED	

MCE/Weinschel Corporation

WIRING DIAGRAM
MODEL 8311-202-X-X

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-8102	B

SCALE NONE SHEET 1 OF 1

DWG. NO.	SH	REV.
	1	

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-146		

REAR PANEL CHAN 1

FRONT PANEL CHAN 1

AT1

AT1A1J1

P3 1 2 3 4 5 6 7 8 9 10 11 12 13 14

+V +V GND GND D2 D3 D0/SDA D1/SCL D6 D7 D4 D5 /12C RST

REAR PANEL CHAN 12

FRONT PANEL CHAN 12

AT12

AT4A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

+V +V GND GND D2 D3 D0/SDA D1/SCL D6 D7 D4 D5 /12C RST

W7

+V +V GND GND D2 D3 D0/SDA D1/SCL D6 D7 D4 D5 /12C RST

P1 J2

1 2 3 4 5 6 7 8 9 10 11 12 13 14

REAR PANEL

S2 IEEE ADDRESS SWITCH 193-9126-000

S2-1 S2-2 S2-3 S2-4 S2-5 S2-6 S2-7 S2-8

1 = ON 0 = OFF

P2 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9

W2

P1 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9

XS1 9 1 8 16 10 2 7 15 11 3 6 14 12 4 5 13

REAR PANEL IEEE 488 J10

DIO1 1
DIO2 2
DIO3 3
DIO4 4
EOI 5
DAV 6
NRFD 7
NDAC 8
IFC 9
SRQ 10
ATN 11
GND 12
DIO5 13
DIO6 14
DIO7 15
DIO8 16
REN 17
GND 18
GND 19
GND 20
GND 21
GND 22
GND 23
GND 24

A1
193-8023-001

J9 P1 W6 P2 J1

1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 10 10 11 11 12 12 13 13 14 14 15 15 16 16 17 17 18 18 19 19 20 20

FRONT PANEL

A4
193-8028-000

A3
193-8029-000

RS232 REAR PANEL

1 6 2 7 3 8 4 9 5

W3

DCD
DSR
RXD
RTS
TXD
CTS
DTR
RI
GND

P1 J1

1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 N/C 10 10

J3 3 2 1

P1 3 2 1

NC GND Vin

W4

T

NC NC W/BLK GRN NC NC

P2 6 5 4 3 2 1

P1 J1 J2 6 5 4 3 2 1

1 1 2 2 3 3

A2
POWER SUPPLY
001-400-15

120 VAC

L

N

P2

T

BLK

WHT

W5

XF1
POWER INPUT

REAR PANEL

W1

GRN/YEL

E1

NOTE:

1. ATTENUATORS AT1 THROUGH AT12 TO BE INSTALLED AS REQUIRED AND MAY CONNECT TO EITHER FRONT OR REAR PANEL DEPENDING UPON CUSTOMER REQUIREMENT.

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QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

193-7302-8	8311-38-12-T
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN HOPKINS	9/02
CHECKED	
ENGR. KNILL	9/02
ISSUED	

MCE/Weinschel Corporation

WIRING DIAGRAM
MODEL 8311

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-8108	A

SCALE NONE SHEET 1 OF 1

DWG. NO.	SH 1	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-162		
	B	INC ECN 02-360 AH	11/14/02	

NOTES:

1. ATTENUATORS AT1 THRU AT12 INSTALLED AS REQUIRED AND CONNECT TO EITHER FRONT OR REAR PANEL AS REQUIRED.

REAR PANEL

S2 IEEE ADDRESS SWITCH 193-9126-000

S2-1 S2-2 S2-3 S2-4 S2-5 S2-6 S2-7 S2-8

1 = ON
0 = OFF

1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9

P2 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9

W2

REAR PANEL IEEE 488

P1 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9

XS1 9 1 8 16 10 2 7 15 11 3 6 14 12 4 5 13

J8

1	DIO1
2	DIO2
3	DIO3
4	DIO4
5	EOI
6	DAV
7	NRFD
8	NDAC
9	IFC
10	SRQ
11	ATN
12	GND
13	DIO5
14	DIO6
15	DIO7
16	DIO8
17	REN
18	GND
19	GND
20	GND
21	GND
22	GND
23	GND
24	GND

A1
193-8023-001

J2 P1

1	1	+V
2	2	+V
3	3	GND
4	4	GND
5	5	D2
6	6	D3
7	7	D0/SDA
8	8	D1/SCL
9	9	D6
10	10	D7
11	11	D4
12	12	D5
13	13	/12C
14	14	RST

RS232 REAR PANEL

W3

1	P1 1	DCD
6	2	DSR
2	3	RXD
7	4	RTS
3	5	TXD
8	6	CTS
4	7	DTR
9	8	RI
5	9	GND
	10	N/C

J9 P1

W6

P2 J1

A4
193-8028-000

A3
193-8029-001

FRONT PANEL

J4 3 2 1

P1 3 2 1

NC GND Vin

T W4

NC NC W/BLK GRN NC NC

P2 6 5 4 3 2 1

J2 6 5 4 3 2 1

P1 J1

A2
POWER SUPPLY
001-400-15

120 VAC

L

N

P2

T

BLK

WHT W5

W1 GRN/YEL E1

XF1
POWER INPUT

REAR PANEL

W7

W8 AT1 W9

AT1A1J1

P5 1 2 3 4 5 6 7 8 9 10 11 12 13 14

+V +V GND GND D2 D3 D0/SDA D1/SCL D6 D7 D4 D5 /12C RST

W10 AT2 W11

AT2A1J1

P4 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W12 AT3 W13

AT3A1J1

P3 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W14 AT4 W15

AT4A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W16 AT5 W17

AT5A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W18 AT6 W19

AT6A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W7

W20 AT7 W21

AT7A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W22 AT8 W23

AT8A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W24 AT9 W25

AT9A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W26 AT10 W27

AT10A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W28 AT11 W29

AT11A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

W30 AT12 W31

AT12A1J1

P2 1 2 3 4 5 6 7 8 9 10 11 12 13 14

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QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

193-7302-8	8311
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

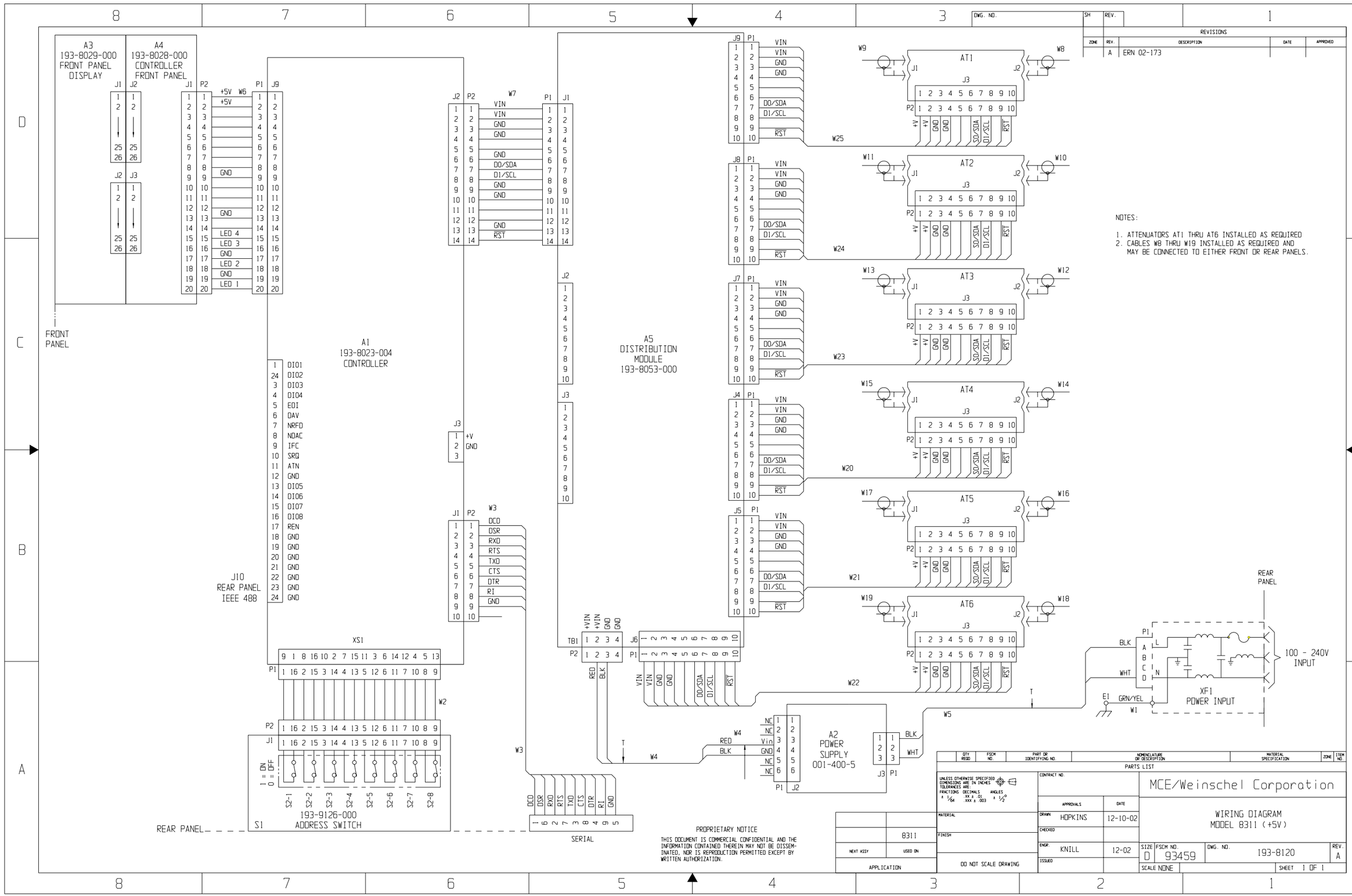
APPROVALS	DATE
DRAWN HOPKINS	10/22/02
CHECKED	
ENGR. KNILL	10/02
ISSUED	

MCE/Weinschel Corporation

WIRING DIAGRAM
MODEL 8311

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-8114	B

SCALE NONE SHEET 1 OF 1


A3
193-8029-000
FRONT PANEL
DISPLAY
A4
193-8028-000
CONTROLLER
FRONT PANEL
FRONT
PANEL
A1
193-8023-004
CONTROLLER
A5
DISTRIBUTION
MODULE
193-8053-000
J10
REAR PANEL
IEEE 488
DIO1
DIO2
DIO3
DIO4
EOI
DAV
NRFD
NDAC
IFC
SRQ
ATN
GND
DIO5
DIO6
DIO7
DIO8
REN
GND
GND
GND
GND
GND
GND
+5V
LED 4
LED 3
LED 2
LED 1
VIN
GND
DO/SDA
DI/SCL
RST
+V
XS1
S1
193-9126-000
ADDRESS SWITCH
1 = ON
0 = OFF
S2-1
S2-2
S2-3
S2-4
S2-5
S2-6
S2-7
S2-8
REAR PANEL
DCD
DSR
RXD
RTS
TXD
CTS
DTR
RI
SERIAL
AT1
AT2
AT3
AT4
AT5
AT6
A2
POWER
SUPPLY
001-400-5
100 - 240V
INPUT
XF1
POWER INPUT
BLK
WHT
GRN/YEL
RED
NOTES:
1. ATTENUATORS AT1 THRU AT6 INSTALLED AS REQUIRED
2. CABLES W8 THRU W19 INSTALLED AS REQUIRED AND
MAY BE CONNECTED TO EITHER FRONT OR REAR PANELS.
REVISIONS
ZONE REV. DESCRIPTION DATE APPROVED
A ERN 02-173
PROPRIETARY NOTICE
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PARTS LIST
MCE/Weinschel Corporation
WIRING DIAGRAM
MODEL 8311 (+5V)
8311
DO NOT SCALE DRAWING
HOPKINS 12-10-02
KNILL 12-02
SIZE D
FSCM NO. 93459
DWG. NO. 193-8120
REV. A
SCALE NONE
SHEET 1 OF 1

DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 05-194 R.S.	12-05	
	B	ECN 06-208 EC	6/21/06	
	C	ECN 08-245 VB	06/08	

A3
193-8029-000
FRONT PANEL
DISPLAY

A4
193-8028-000
CONTROLLER
FRONT PANEL

J1 J2
J2 J3

FRONT
PANEL

J1 P2 — P1 J9 — W6

1	+5V
2	+5V
3	
4	
5	
6	
7	
8	GND
9	
10	
11	
12	GND
13	
14	LED 4
15	LED 3
16	GND
17	LED 2
18	GND
19	LED 1
20	

A1
193-8023-004
CONTROLLER

J10
REAR PANEL
IEEE 488

1	DIO1
24	DIO2
3	DIO3
4	DIO4
5	EDI
6	DAV
7	NRFD
8	NDAC
9	IFC
10	SRQ
11	ATN
12	GND
13	DIO5
14	DIO6
15	DIO7
16	DIO8
17	REN
18	GND
19	GND
20	GND
21	GND
22	GND
23	GND
24	GND

J3

1	+V
2	GND
3	

J1 P2

1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	

W3

XS1
9 1 8 16 10 2 7 15 11 3 6 14 12 4 5 13
P1 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9
W2
P2 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9
J1 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9
1 = ON
0 = OFF
S2-1 S2-2 S2-3 S2-4 S2-5 S2-6 S2-7 S2-8
193-9126-000
ADDRESS SWITCH
S1
REAR PANEL

W7

J2 P2 — J1 — P1

1	VIN
2	VIN
3	GND
4	GND
5	
6	GND
7	DO/SDA
8	D1/SCL
9	GND
10	
11	
12	GND
13	RST
14	

VIN VIN GND GND DO/SDA D1/SCL RST GND RST

A5
DISTRIBUTION
MODULE
193-8053-001

J2
J3
J4
J5
J6

TB1 1 2 3 4
P2 1 2 3 4
+VIN +VIN GND GND
ORN
WHT/BLK
W4

A2
POWER
SUPPLY
001-400-15

P1 J2: NC NC Vin GND NC NC
ORN
WHT/BLK
T

J3 P1: BLK WHT

W5
E1

W10 — TO: AT9-J3
SHEET 2
(NOT USED ON MODEL 8311-352-6-F)

J9 P1

1	VIN
2	VIN
3	GND
4	GND
5	
6	
7	DO/SDA
8	D1/SCL
9	
10	RST

W11 — TO: AT1-J3 THRU AT4-J3
SHEET 2

J8 P1

1	VIN
2	VIN
3	GND
4	GND
5	
6	
7	DO/SDA
8	D1/SCL
9	
10	RST

W12 — TO: AT5-J3 THRU AT8-J3
SHEET 2

J7 P1

1	VIN
2	VIN
3	GND
4	GND
5	
6	
7	DO/SDA
8	D1/SCL
9	
10	RST

REAR
PANEL

BLK
WHT
GRN/YEL
T
W1
P1 A B C D L N
115 - 230V
INPUT
XF1
POWER INPUT

DCD DSR RXD RTS TXD CTS DTR RI GND
1 6 2 7 3 8 4 9 5
SERIAL

ITEM NO.	ZONE	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	MATERIAL SPECIFICATION	FSCM NO.	QTY REQD

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS XX ± .01 XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

APPROVALS	DATE
DRAWN R. SHOCK	12-05
CHECKED A. HOPKINS	12-05
ENGR. B. KNILL	12-05
ISSUED	

DO NOT SCALE DRAWING

MATERIAL
FINISH

NEXT ASSY	USED ON
193-7306-9	8311-352-9-T

APPLICATION

Aeroflex / Weinschel

WIRING DIAGRAM
MODEL 8311-352-X-X

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-8129	C

SCALE NONE SHEET 1 OF 4

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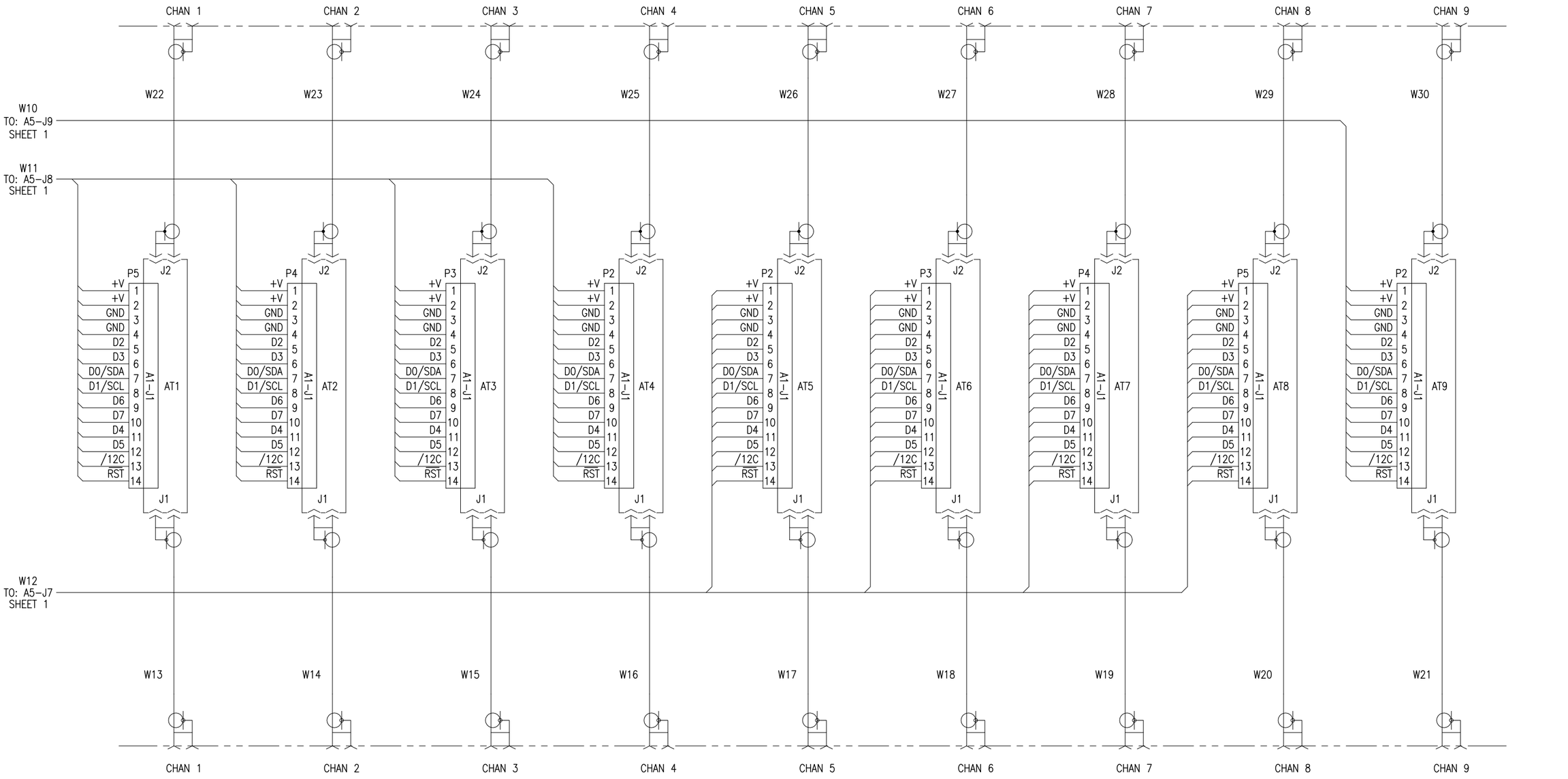
DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1 FOR REVISIONS		

REAR PANEL



FRONT PANEL

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QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

193-7306-9	8311-352-9-T
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS XX ± .01 XXX ± .003 ANGLES ± 1/2°

MATERIAL
FINISH
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN	
CHECKED	
ENGR.	
ISSUED	

Aeroflex / Weinschel

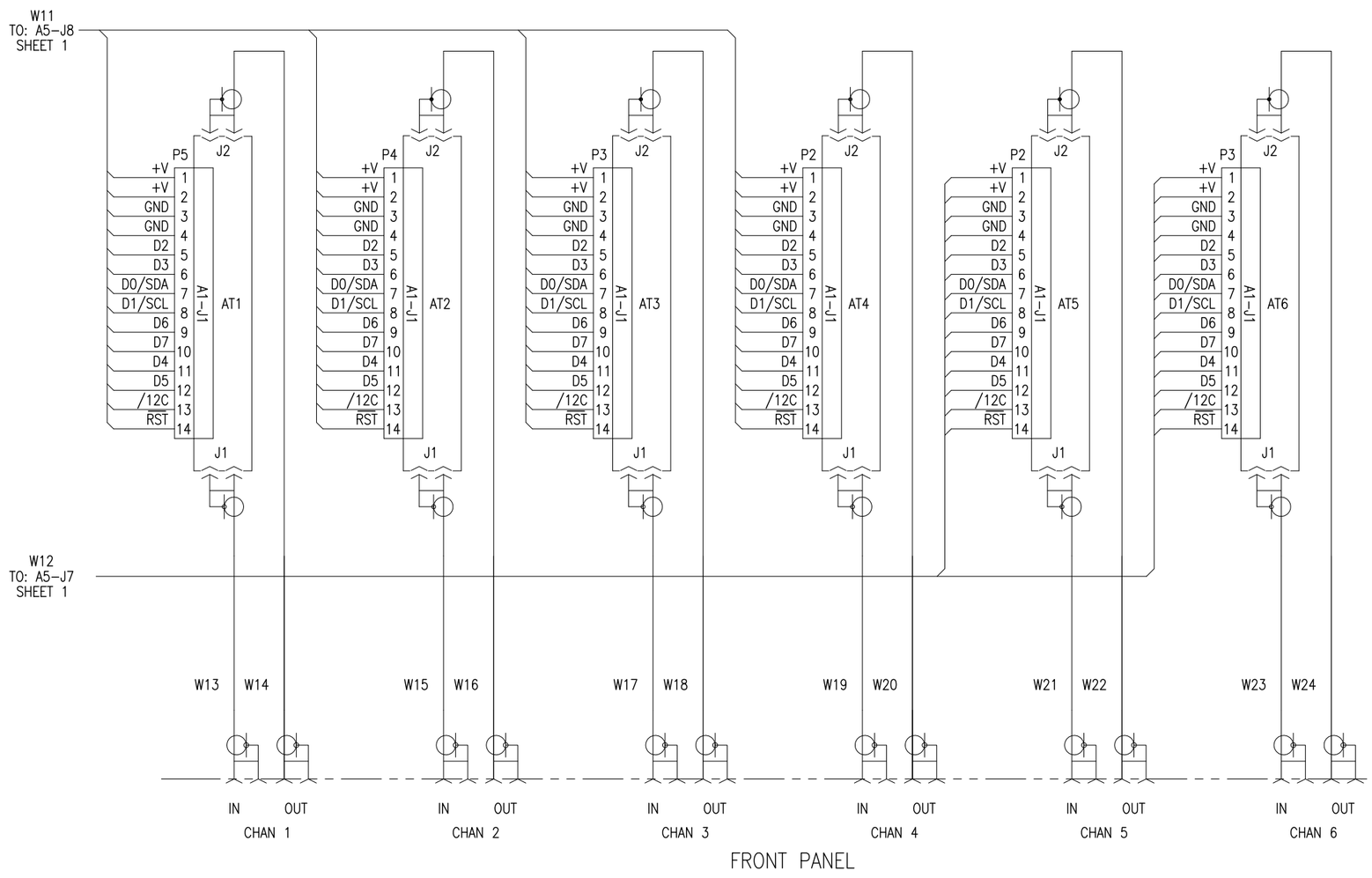
WIRING DIAGRAM
MODEL 8311-352-9-T

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-8129	C

SCALE NONE SHEET 2 OF 4

DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1 FOR REVISIONS		



FRONT PANEL

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

PROPRIETARY NOTICE

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193-7306-9	8311-352-6-F
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .03 .XXX ± .003 ANGLES ± 1/2°

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN	
CHECKED	
ENGR.	
ISSUED	

Aeroflex / Weinschel

WIRING DIAGRAM
MODEL 8311-352-6-F

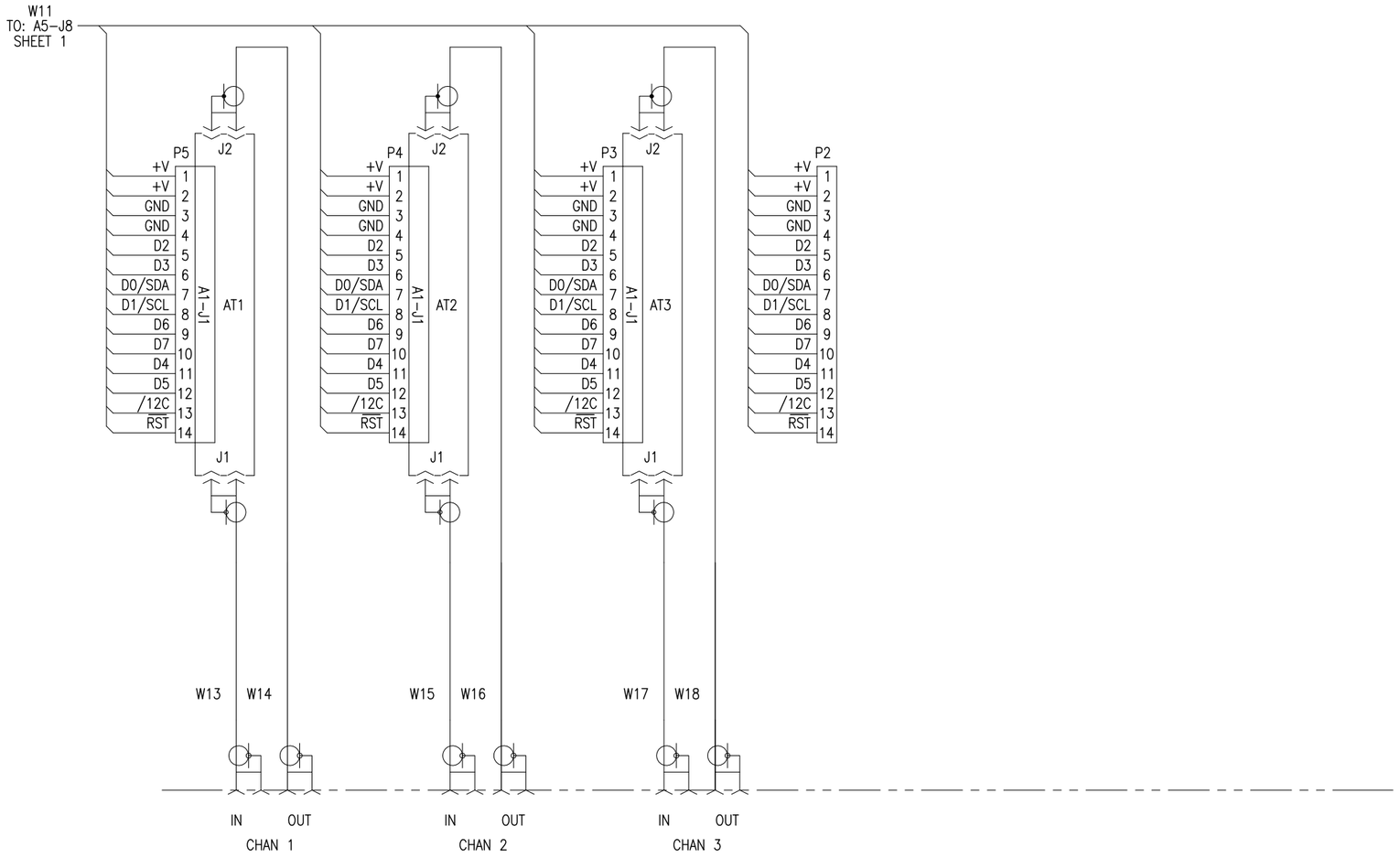
SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-9129	C

SCALE NONE SHEET 3 OF 4

DWG. NO.	SH	REV.

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1 FOR REVISIONS		



FRONT PANEL

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QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

193-7306-9	8311-352-6-F
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS XX ± .01 XXX ± .003 ANGLES ± 1/2°

MATERIAL
FINISH
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN	.
CHECKED	.
ENGR.	.
ISSUED	

Aeroflex / Weinschel

WIRING DIAGRAM
MODEL 8311-352-3-R

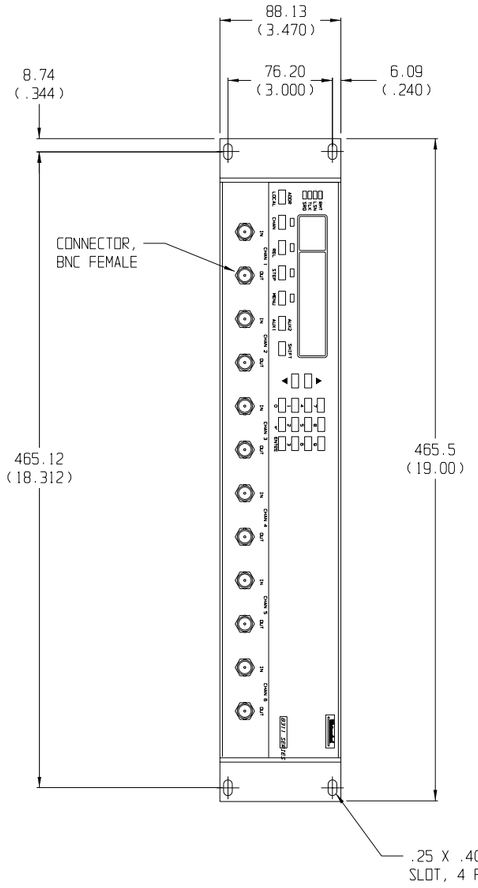
SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	193-9129	C

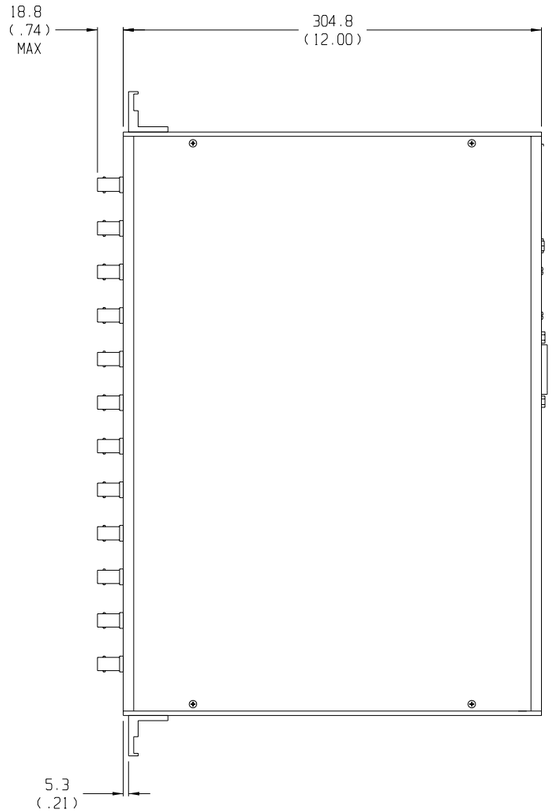
SCALE NONE SHEET 4 OF 4

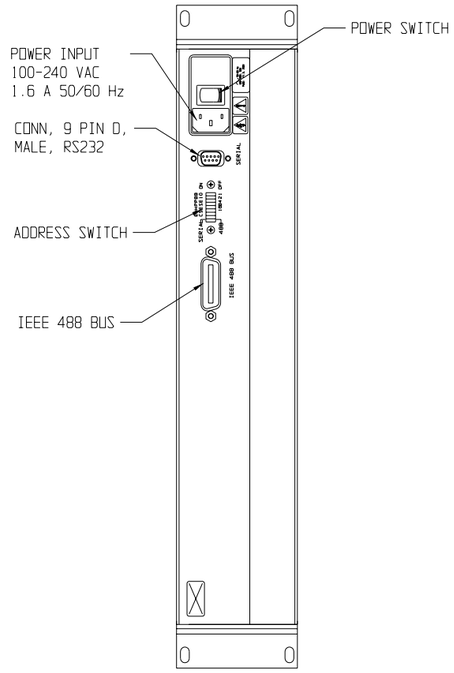
DWG. NO.	SH 1	REV.

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-173		







SPECIFICATIONS:

BUS: IEEE 488, PROTOCOL PER IEEE 488.2
RS232
OPERATIONAL TEMP: 0° TO +50°C
STORAGE TEMP: -55°C TO +75°C
WEIGHT: 12.5 LB MAX

MODEL NO.	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. OF CHAN	ATTEN TYPE	CONN TYPE	CONN LOCATION
8311-1-6-F	63/1	DC-1.0 GHz (75 OHMS)	6.0 dB MAX	1.6 MAX	6	3250T-63	BNC/F	FRONT

NOTES:
1. ALL DIMENSIONS GIVEN IN MM (INCHES)

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	8311
NEXT ASSY	USED ON
APPLICATION	

INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
PARTS LIST						

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
± 1/64 .XX ± .01 ± 1/2°
.XXX ± .003

MATERIAL
FINISH
DO NOT SCALE DRAWING

	APPROVALS	DATE
CONTRACT NO.		
DRAWN	HOPKINS	11/02
CHECKED		
ENGR.	KNILL	12/02
ISSUED		

MCE/Weinschel Corporation

ICD, MULTI-CHANNEL ATTENUATOR
MODEL 8311-1-X-X

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	089-3594	A

SCALE 1/2 SHEET 1 OF 1

DWG. NO.	SH	REV.

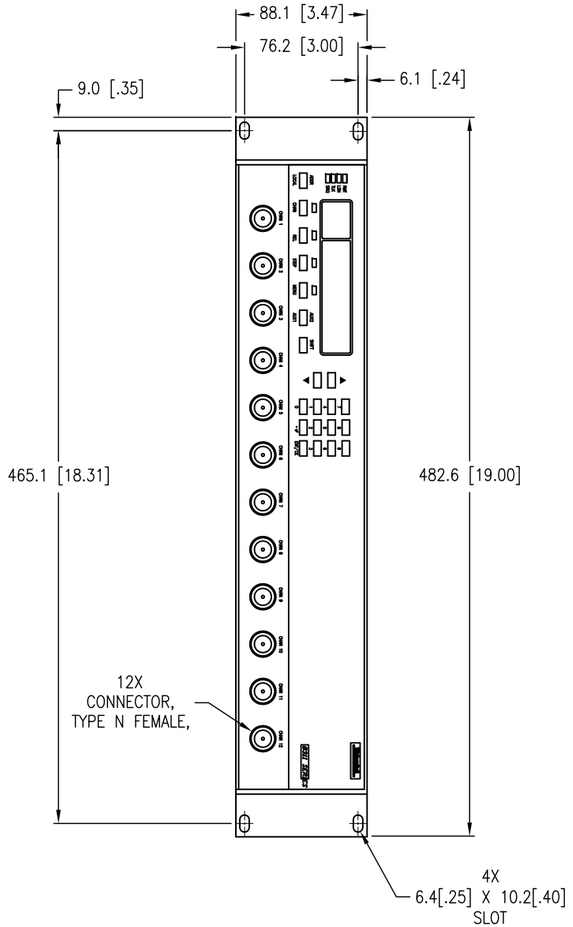
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-162 .	.	
	B	ECN 02-360 AH	11/11/02	
	C	ERN 10-251 RS	AUG 10	

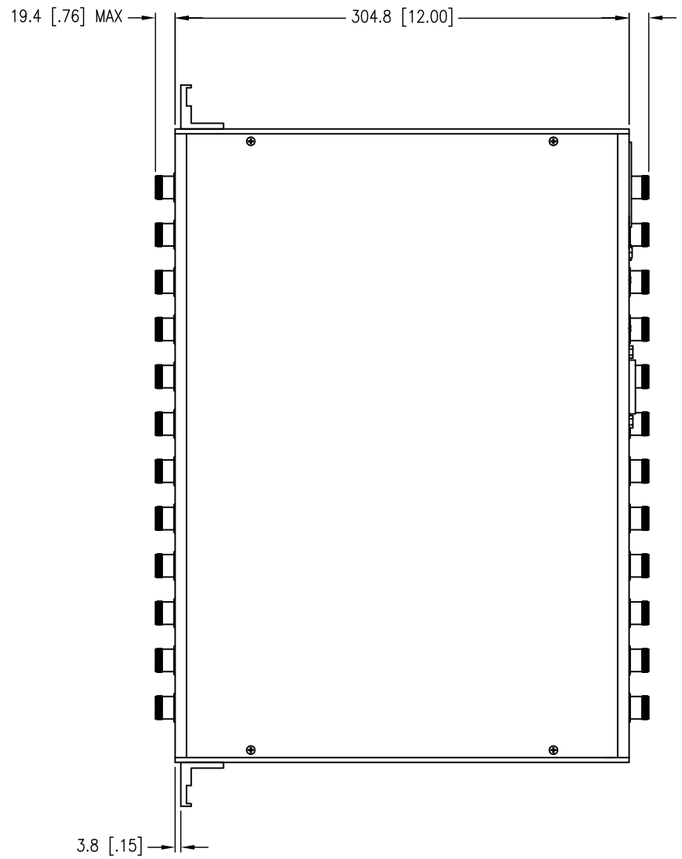
NOTES:
1. ALL DIMENSIONS GIVEN IN MM (INCHES)

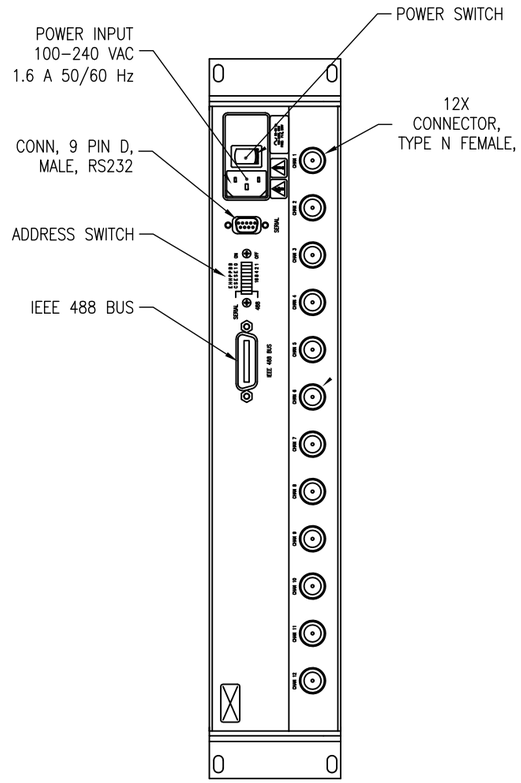
SPECIFICATIONS:

BUS: IEEE 488, PROTOCOL PER 1EEE 488.2
RS232
OPERATIONAL TEMP: 0° TO +50°C
STORAGE TEMP: −55°C TO +75°C
WEIGHT: 12.5 LB MAX

SPECIFICATIONS								
MODEL NUMBER	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. CHANNEL	ATTEN TYPE	CONN TYPE	CONN LOCATION
8311-38-12-T	63/1	dc TO 2000 MHz	5.25 dB MAX	1.5:1	12	3206T-1	TYPE N/F	FRONT TO REAR
8311-38-6-F	63/1	dc TO 2000 MHz	5.25 dB MAX	1.5:1	6	3206T-1	TYPE N/F	FRONT







INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
PARTS LIST						

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

AEROFLEX WEINSCHEL

APPROVALS	DATE
DRAWN HOPKINS	10-02
CHECKED .	.
ENGR. KNILL	10-02
ISSUED	

ICD, MULTI-CHANNEL ATTENUATOR
MODEL 8311-38-X-X

.	8311
NEXT ASSY	USED ON
APPLICATION	

MATERIAL .
FINISH .
DO NOT SCALE DRAWING

SIZE D | CAGE: 93459 | DWG. NO. 089-3584 | REV. C
SCALE 1:2 | SHEET 1 OF 1

AUTOCAD V.2007

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DWG. NO.	SH	REV.

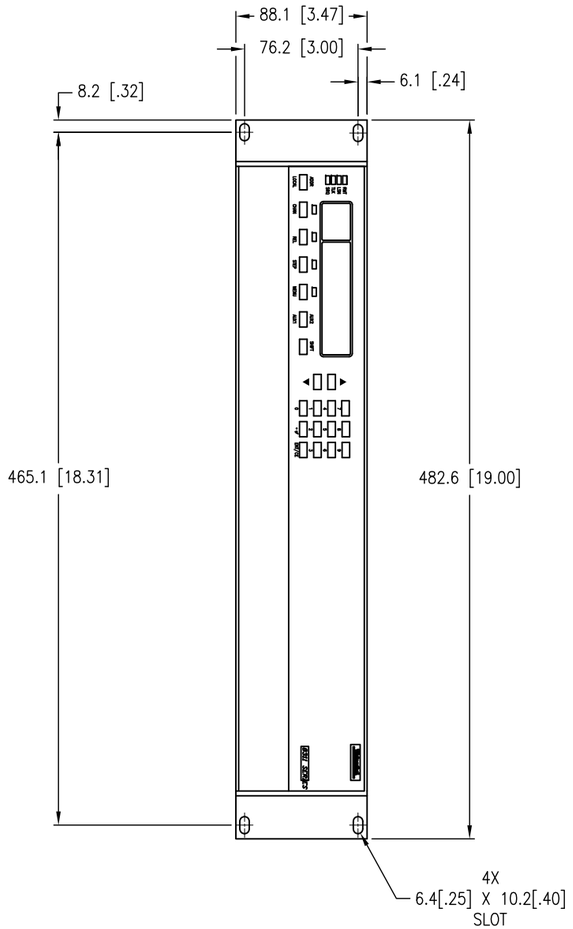
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 04-021 .	02-04	
	B	ERN 10-251 RS	AUG 10	

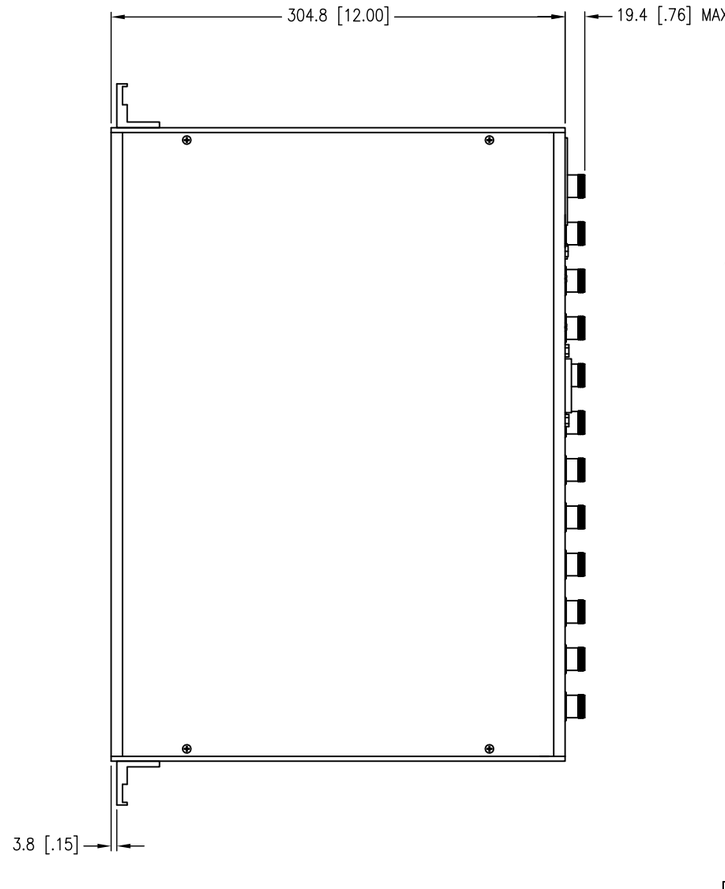
NOTES:
1. ALL DIMENSIONS GIVEN IN MM (INCHES)

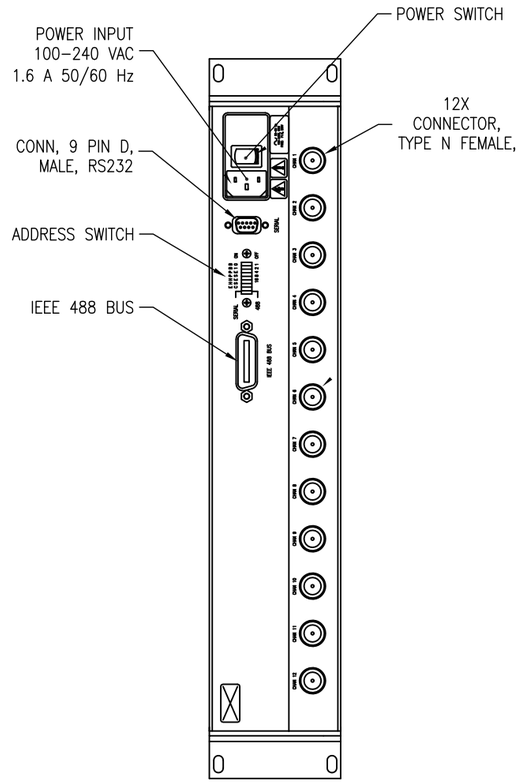
SPECIFICATIONS:

BUS: IEEE 488, PROTOCOL PER 1EEE 488.2
RS232
OPERATIONAL TEMP: 0° TO +50°C
STORAGE TEMP: -55°C TO +75°C
WEIGHT: 12.5 LB MAX

SPECIFICATIONS								
MODEL NUMBER	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. CHANNEL	ATTEN TYPE	CONN TYPE	CONN LOCATION
8311-137-6-R	63/1	.8 TO 3.0 GHz	4.7 dB MAX	1.6:1	6	4226T-63	TYPE N/F	REAR







INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

PROPRIETARY NOTICE
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193-7303-12	8311
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL .
FINISH .
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN R. SHOCK	02-04
CHECKED .	.
ENGR. KNILL	02-04
ISSUED	

AEROFLEX WEINSCHEL

ICD, MULTI-CHANNEL ATTENUATOR MODEL 8311-137-6-R

SIZE	CAGE:	DWG. NO.	REV.
D	93459	089-3724	B
SCALE 1:2		SHEET 1 OF 1	

AUTOCAD V.2007

DWG. NO.	SH	REV.

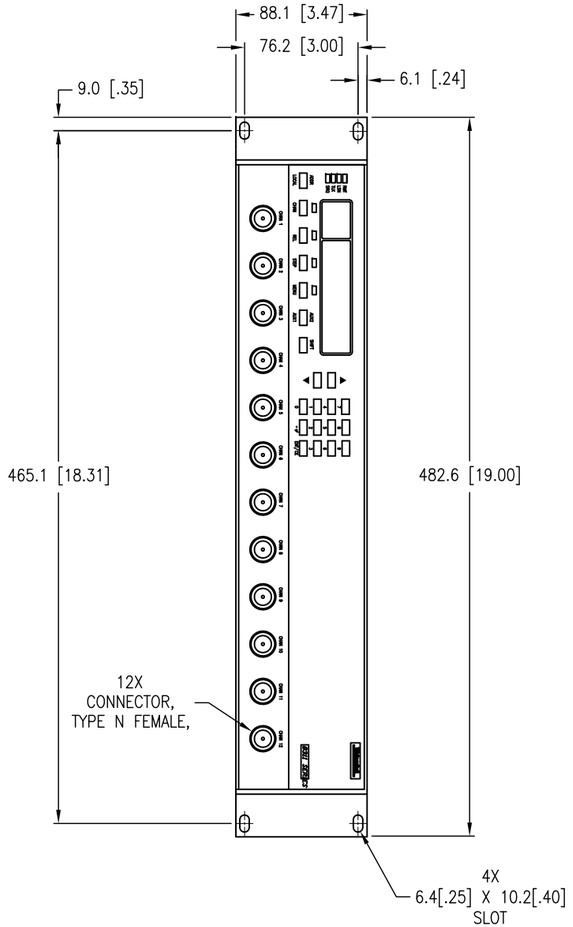
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02–173 .	.	
	B	ECN 08–256 VB	07/08	
	C	ERN 10–251 RS	AUG 10	

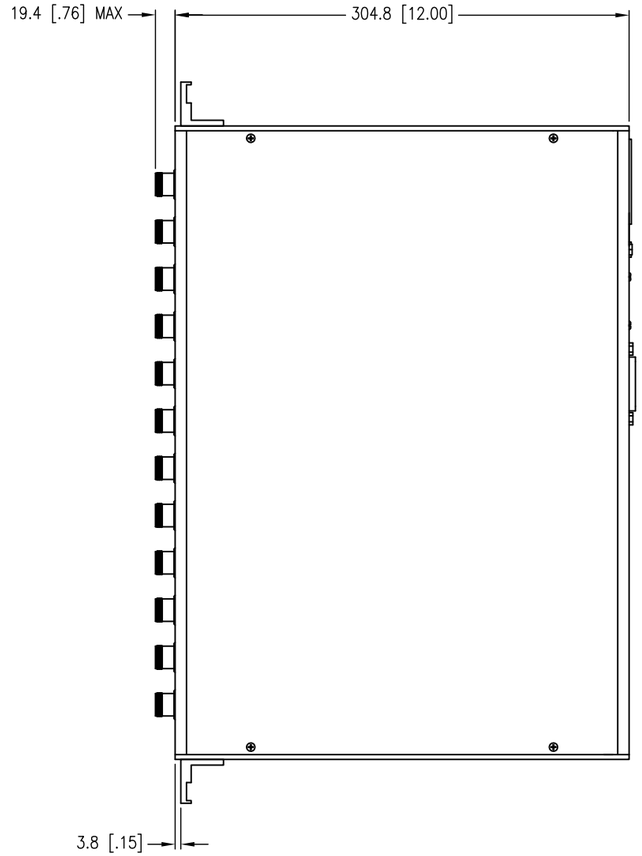
NOTES:
1. ALL DIMENSIONS GIVEN IN MM (INCHES)

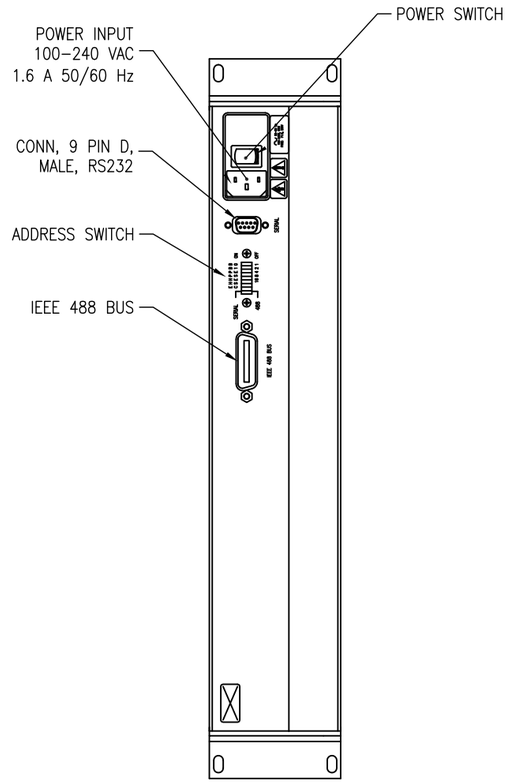
SPECIFICATIONS:

BUS: IEEE 488, PROTOCOL PER 1EEE 488.2
RS232
OPERATIONAL TEMP: 0° TO +50°C
STORAGE TEMP: –55°C TO +75°C
WEIGHT: 12.5 LB MAX

SPECIFICATIONS								
MODEL NUMBER	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. CHANNEL	ATTEN TYPE	CONN TYPE	CONN LOCATION
8311–137–6–F	63/1	.8 TO 3.0 GHz	4.7 dB MAX	1.75:1	6	4226T–63	TYPE N/F	FRONT







PROPRIETARY NOTICE
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INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

AEROFLEX WEINSCHEL

APPROVALS	DATE
DRAWN HOPKINS	12–02
CHECKED .	.
ENGR. KNILL	12–02
ISSUED	

ICD, MULTI–CHANNEL ATTENUATOR
MODEL 8311–137–6–F

SIZE	CAGE:	DWG. NO.	REV.
D	93459	089–3599	C

SCALE 1:2 SHEET 1 OF 1

.	8311
NEXT ASSY	USED ON
APPLICATION	DO NOT SCALE DRAWING

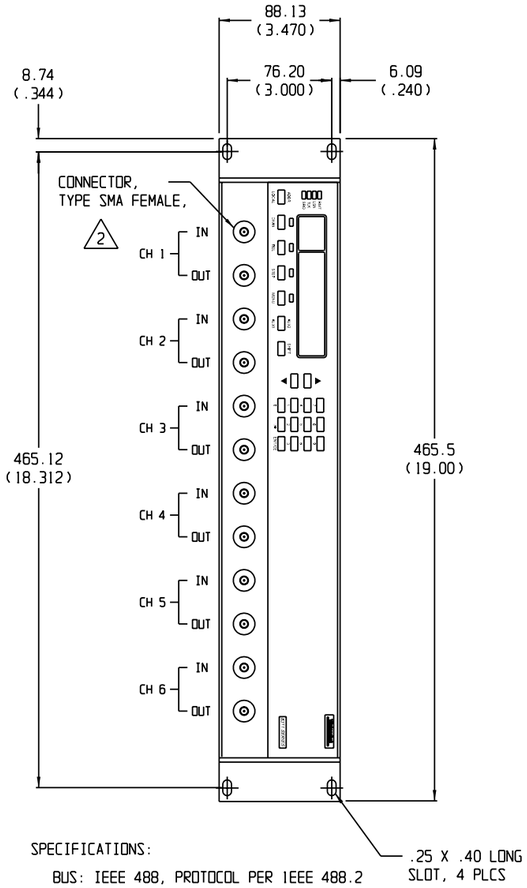
MATERIAL .
FINISH .

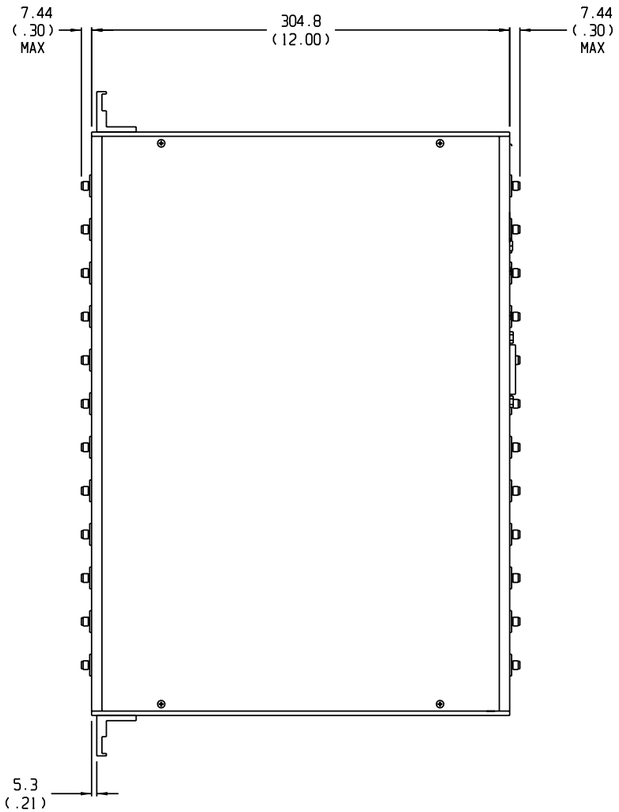
AUTOCAD V.2007

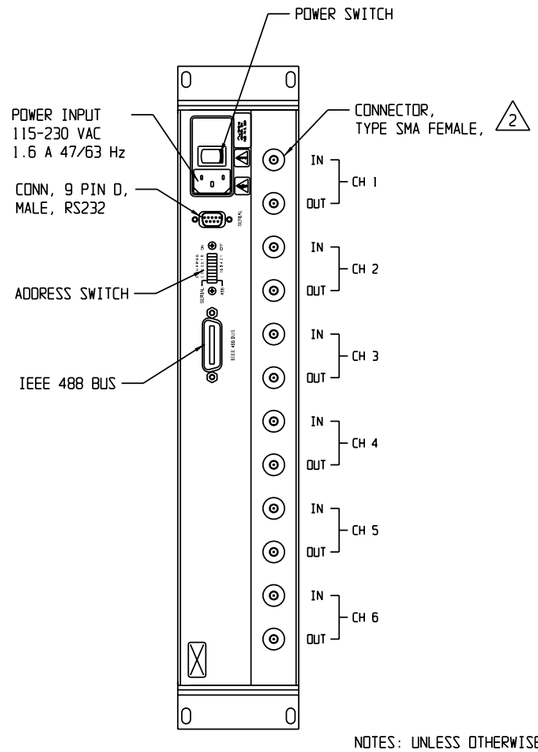
DWG. NO.	SH 1	REV.

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	ERN 02-136		
	B	INC ECN 02-360 AH	12-06-02	
	C	ECN 06-032 RS	02-06	







SPECIFICATIONS:

BUS: IEEE 488, PROTOCOL PER IEEE 488.2
RS232
OPERATIONAL TEMP: 0° TO +50°C
STORAGE TEMP: -55°C TO +75°C
WEIGHT: 12.5 LB MAX

NOTES: UNLESS OTHERWISE SPECIFIED.

1. ALL DIMENSIONS GIVEN IN MM (INCHES)

2 CONNECTORS INSTALLED FRONT OR REAR AS REQUIRED.

MODEL NO.	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. CHANNEL	ATTEN TYPE (1)	CONN TYPE	CONN LOCATION
8311-202-2-F	121/1	DC-18 GHz	5.25 MAX	1.95	2	150T-11 + 150T-110	SMA/F	FRONT
8311-202-3-F	121/1	DC-18 GHz	5.25 MAX	1.95	3	150T-11 + 150T-110	SMA/F	FRONT
8311-204-6-F	62/2	DC-18 GHz	3.25	1.95	6	150T-62	SMA/F	FRONT
8311-204-6-R	62/2	DC-18 GHz	3.25	1.95	6	150T-62	SMA/F	REAR

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INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
PARTS LIST						

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.

Aeoflex / Weinschel

ICD, MULTI-CHANNEL ATTENUATOR

APPLICATION		NEXT ASSY	USED ON

MATERIAL

FINISH

DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN G.THOMAS	8-02
CHECKED	
ENGR. KNILL	8-02
ISSUED	

SIZE D | FSCM NO. 93459 | DWG. NO. 089-3574 | REV. C

SCALE 1/2 | SHEET 1 OF 1

DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
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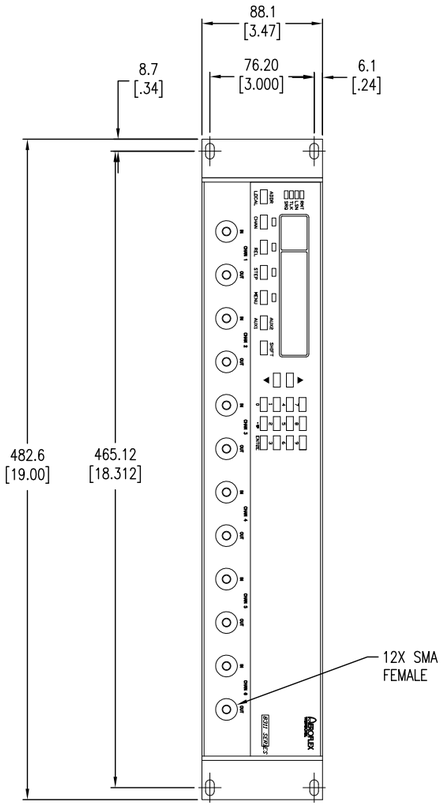
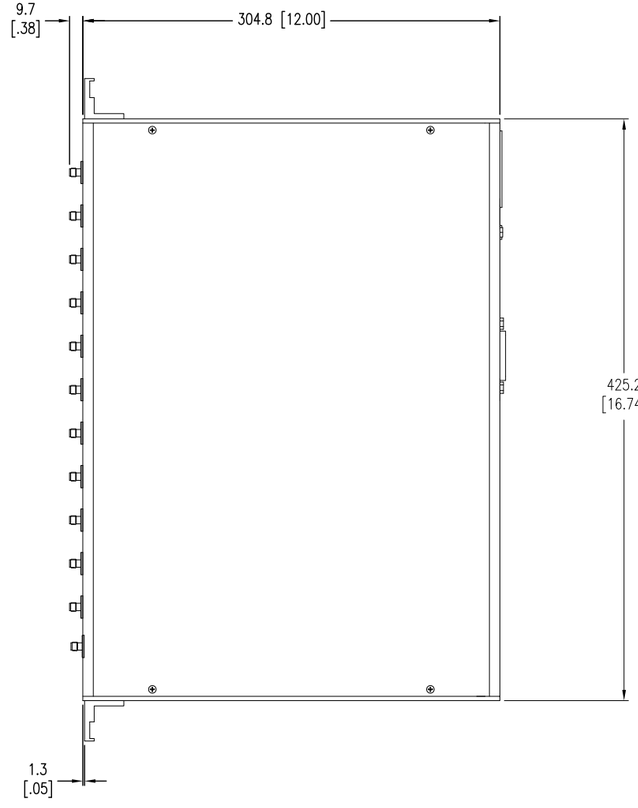
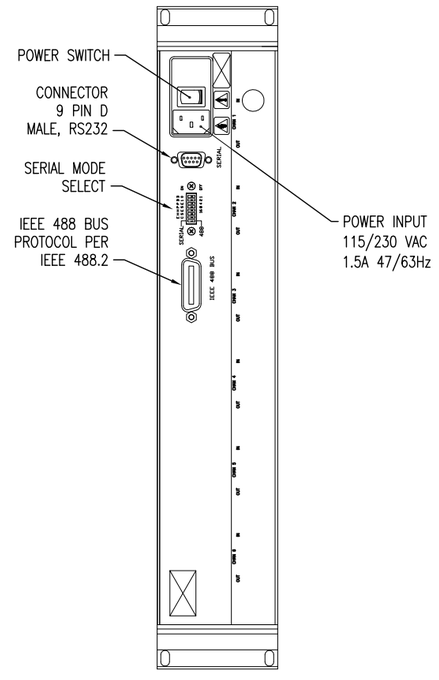
	B	ECN 06-010 R.S.	01-06	
	C	ECN 08-245 VB.	06/08	







MODEL NUMBER	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. OF CHAN	ATTEN TYPE (1)	CONN TYPE	CONN LOCATION
8311-352-6-F	103/1	DC - 6.0 GHz	6.0dB	1.55	6	3408T-103	SMA/F	FRONT

(1) SEE ATTENUATOR INTERFACE CONTROL DRAWING FOR RF SPECIFICATIONS

NOTES:
1. ALL DIMENSIONS GIVEN IN MM [INCHES]

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INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
PARTS LIST						

NEXT ASSY	USED ON
193-7306-6	8311-352-6-F
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS .XX ±.01 .XXX ±.003 ANGLES ± 1/2°

MATERIAL .
FINISH .
DO NOT SCALE DRAWING

CONTRACT NO.

Aeroflex / Weinschel

APPROVALS	DATE
DRAWN R. SHOCK	12-05
CHECKED A. HOPKINS	12-05
ENGR. B. KNILL	12-05
ISSUED	

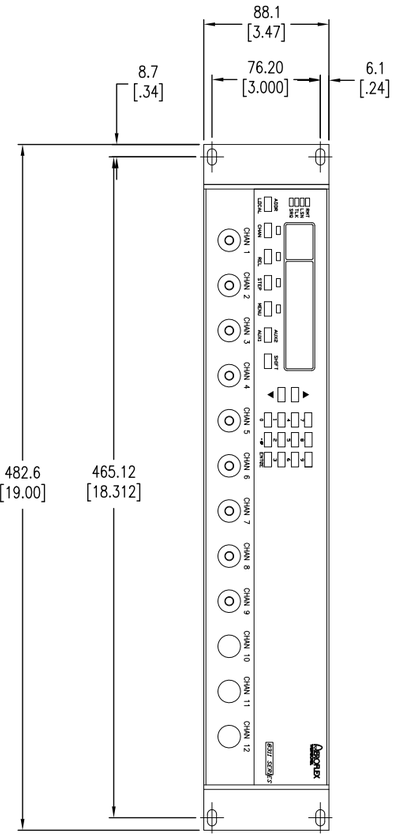
ICD, ATTEN UNIT
MODEL 8311, SERIES
(6 CHANNEL)

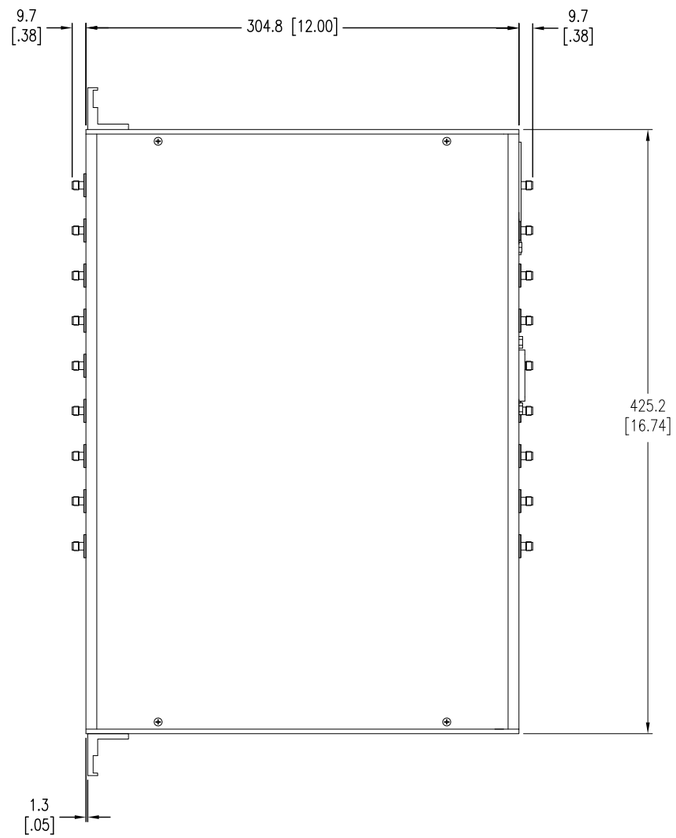
SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	089-3868	C

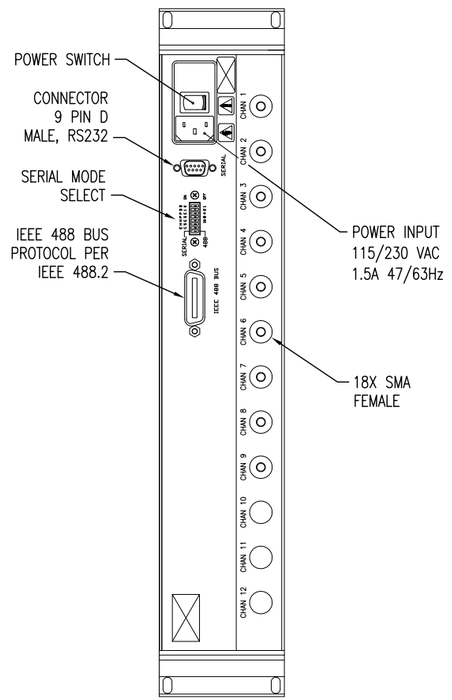
SCALE 1 : 2 SHEET 1 OF 3

DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	.	SEE SHEET 1 FOR REVISIONS .	.	







MODEL NUMBER	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. OF CHAN	ATTEN TYPE (1)	CONN TYPE	CONN LOCATION
8311-352-9-T	103/1	DC – 6.0 GHz	6.0dB	1.55	9	3408T-103	SMA/F	FRONT/REAR

(1) SEE ATTENUATOR INTERFACE CONTROL DRAWING FOR RF SPECIFICATIONS

NOTES:
1. ALL DIMENSIONS GIVEN IN MM [INCHES]

INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/64 DECIMALS XX ± .01 XXX ± .003 ANGLES ± 1/2°

CONTRACT NO.	
MATERIAL	.
FINISH	.
DO NOT SCALE DRAWING	

APPROVALS	DATE
DRAWN R. SHOCK	12-05
CHECKED A. HOPKINS	12-05
ENGR. B. KNILL	12-05
ISSUED	

Aeroflex / Weinschel

ICD, ATTEN UNIT
MODEL 8311, SERIES
(9 CHANNEL)

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	089-3868	C

SCALE 1 : 2 SHEET 2 OF 3

NEXT ASSY	USED ON
193-7306-9	8311-352-9-T
APPLICATION	

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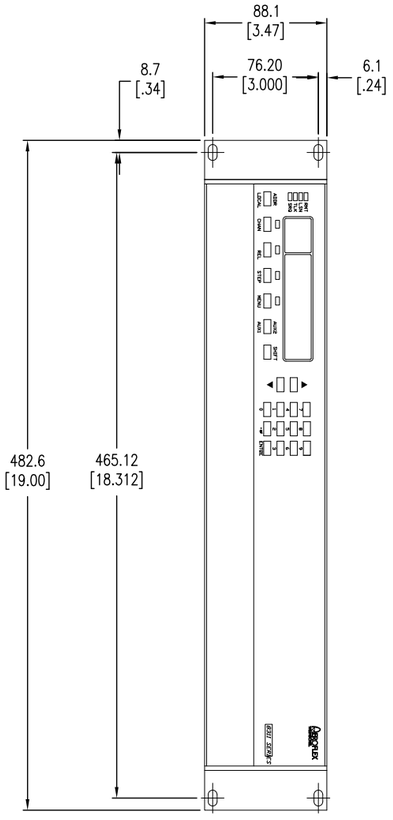
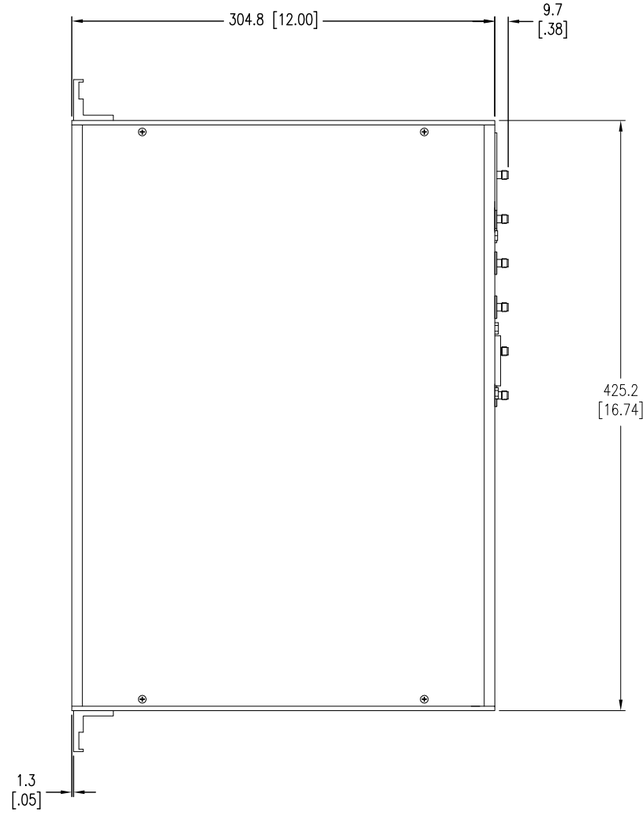
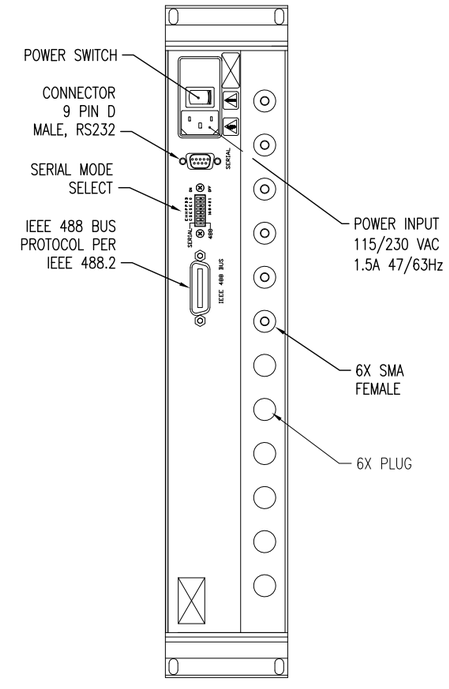
DWG. NO.	SH	REV.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	.	SEE SHEET 1 FOR REVISIONS .	.	







MODEL NUMBER	ATTEN VALUE	FREQ RANGE	INSERTION LOSS	SWR	NO. OF CHAN	ATTEN TYPE (1)	CONN TYPE	CONN LOCATION
8311-352-3-R	103/1	DC – 6.0 GHz	6.0dB	1.55	3	3408T-103	SMA/F	REAR

(1) SEE ATTENUATOR INTERFACE CONTROL DRAWING FOR RF SPECIFICATIONS

NOTES:
1. ALL DIMENSIONS GIVEN IN MM [INCHES]

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INTERFACE CONTROL DRAWING

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	ZONE	ITEM NO.
			PARTS LIST			

193-7306-13	8311-352-3-R
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± 1/64 DECIMALS .XX ± .01 .XXX ± .003 ANGLES ± 1/2°

MATERIAL .

FINISH .

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN V. BETSIS	06/08
CHECKED A. HOPKINS	06/08
ENGR. B. KNILL	06/08
ISSUED	

Aeroflex / Weinschel

ICD, ATTEN UNIT
MODEL 8311, SERIES
(3 CHANNEL)

SIZE	FSCM NO.	DWG. NO.	REV.
D	93459	089-3868	C

SCALE 1 : 2 SHEET 3 OF 3

APPENDIX A
CARE AND HANDLING OF MICROWAVE COAXIAL CABLE ASSEMBLIES

A-1 CARE AND HANDLING OF ASSEMBLIES.

To ensure accurate measurements and optimal performance of Weinschel products, the microwave coaxial cable assemblies used in system and test setups must be properly used and maintained. Proper connections, routine inspection of all cables, and cleaning of the connectors are extremely important procedures which can prolong the longevity and accuracy of equipment.

A-2 CABLE INSPECTION.

Routinely check external cables for signs of cracked insulation, dents, twists, flattening, signs of jacket abrasion, or other signs of abuse. Wrinkles in the jacket indicate that the minimum bend radius has been exceeded. Most often, this occurs near the marker tubes and connectors.

Also inspect the connector interfaces for the following:

- Bent pins (male).
- Bent or missing tines (female).
- Worn or chipped plating.
- Damaged or displaced dielectric inserts.
- Thread damage.
- Folded or mushroomed outer interface rims.
- Mushroomed pin shoulders (male) or tine ends (female).
- Score lines on pins and outer interface rims visible to the unaided eye.
- Recessed or protruding pins.

It is advisable to clean the connectors prior to inspection to make subtle damage more apparent. If any of the above is noted, replace the assembly before its further use results in equipment damage. Also inspect the mating connectors for similar damage.

Inspect the connector interface for signs of debris. Debris may be in the form of:

- Plating chips or other metal particles.
- Dust or dirt.
- Oily films.
- Other miscellaneous foreign particles.

If signs of debris are present, clean the connector interface as directed in Paragraph A-6.

A-3 MAKING INITIAL CONNECTIONS.

Exercise caution when mating cables. Poor connections lead to poor system performance. They can also damage not only the cable assembly, but more significantly, front or rear panel connectors on the equipment itself which may be more difficult to repair.

A-3.1 ALIGNING CONNECTORS. Align the center lines of two connectors before actual mating. Male retaining nuts contain a small amount of necessary play which may make it possible to mate the threads without the pins being properly aligned. Pin misalignment can damage pins and dielectric inserts.

A-3.2 MATING CONNECTORS. Gently mate the connectors by hand, taking care not to force the coupling nut at the slightest resistance. It is often possible to feel whether or not the pins are mated. If the coupling nut is difficult to turn, either the pins are not mated, the coupling nut is cross-threaded, or one of the connectors has been damaged by excess torque.

Never hold a male connector coupling nut stationary while screwing a female connector into it. This rotation can erode the plating and damage both the outer interface rim as well as the pin. If the pins become locked, serious damage can result to both the equipment and the cable assembly.

A-4 ENSURING PROPER CONNECTOR TORQUE.

A-4.1 OVERTORQUING. Once connectors have been properly mated, apply only the proper amount of torque. Overtorquing damages both connectors involved. Also, a connector which has been damaged by overtorquing, in turn, damages every connector to which it is subsequently mated. It usually leads to poor system performance as well. Overtorque can cause:

- Bent pins.
- Recessed or protruding pins.
- Recessed or protruding dielectrics.
- Chipped plating.
- Damaged coupling threads.
- Coupling nut retaining ring damage.
- Mushroomed outer interface shells.
- Mushroomed pin shoulders.

A-4.2 HEX-NUT TYPES. To mate a connector of the hex-nut type, always use a torque wrench set to the correct torque value. Tighten the connector slowly until the wrench snaps. Tightening too quickly can cause the wrench to exceed its set limit. Do not snap the wrench more than once as this also causes overtorque.

A-4.3 KNURLED NUTS. Tighten connectors with knurled nuts by hand. If this does not provide sufficient tightness use a hex-nut connector and torque wrench instead. Never use pliers to tighten a connector. Table A-1 recommends torque specifications for the various types of connectors.

Table A-1. Recommended Torque Values

Connector	Recommended Torque
GPC-7 (7mm) w/hex nut	14 in/lbs ± 1 in/lbs
Type N w/hex nut	14 in/lbs ± 1 in/lbs
SMA, 2.92mm, 3.5mm 2.4mm, WPM, WPM-3 WPM-4	7.5 in/lbs ± 0.5 in/lbs
Type N & TNC (knurled)	Hand-tight
BNC (knurled)	Hand-tight

A-5 PROPER CABLE HANDLING.

Never exceed the minimum bend radius specified for a cable. Guard against tight bends at the end of connector strain relief tubing, or at the ends of marker tubing where they may be less noticeable. Although cable bend may seem slight, the actual radius of the bend at the point of angular departure may be far smaller than the acceptable radius.

Never pinch, crush or drop objects on cable assemblies. Also, do not drag a cable over sharp edges as this will pinch it and cause it to exceed the minimum bend radius.

Never use a cable assembly to pull a piece of equipment. Cables and connectors are not designed to support or move equipment.

A-5.1 SECURING CABLES. Use toothed, rubber-lined "P-clamps" to hold cables in place. If it is necessary to use tie-wraps, use the widest possible wrap and the lowest setting on the gun to ensure the minimum pressure on the cable.

A-5.2 STORING CABLES. When storing cables, minimize cable "set" by coiling them in large diameters (1 or 2 feet). Unroll the cable properly when it is ready to be used; do not pull the loops out hastily. Similarly, re-roll them when storing them away again.

A-6 CLEANING CONNECTOR INTERFACES.

Use the following guidelines in cleaning connector interfaces:

a. Do not use chlorinated solvents including common tap water. These solvents are extremely penetrating and sometimes ruin otherwise good devices and assemblies.

b. Moisten a cotton swab with isopropyl alcohol. Roll the swab on a paper towel to remove excess.

c. Use the moistened cotton swab to wipe away debris. Do not try to dissolve the debris by overwetting the swab.

d. Repeat the cleaning process using additional swabs as necessary. If metallic particles are embedded in the dielectric, use an eyeglass and a sharp pick in an attempt to dislodge them. Swab again.

e. When satisfied that the interfaces are clean, blow them dry with dry compressed air, or preferably dry nitrogen (pressurized spray cans work well). Do not use breath.

f. Clean the mating connectors. These may be the source of the debris.

Number	**Required Item**	**Implementation**
1	Interface Function Subsets Implemented	SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, C0
2	Device behavior when the address is set outside of the 0-30 range	The 8310 address is set to 10
3	When is a user address changed recognized?	When the DIP switch setting is changed
4	Description of settings at power-on	User programmable via macro
5	Message exchange options a. Size and behavior of input buffer b. Queries that return more than one <RESPONSE MESSAGE UNIT> c. Queries that generate a response when parsed d. Queries that generate a response when read e. Commands that are coupled	a. The GPIB input buffer is 2048 bytes in length. When the Input Buffer becomes full it processes the messages currently received before accepting additional messages. All data bytes received will be stored in the Input Buffer until 'end of message' is detected. The message(s) received are the processed in the order received. b. The 8310 contains no Query commands that return more than one <RESPONSE MESSAGE UNIT> c. All valid queries generate a response when parsed. The reply is generated at the time the Query message is received. d. none e. none
6	Functional elements used in construction of device specific commands	<PROGRAM MESSAGE> <PROGRAM MESSAGE TERMINATOR> <PROGRAM MESSAGE UNIT> <PROGRAM MESSAGE UNIT SEPARATOR> <COMMAND MESSAGE UNIT> <QUERY MESSAGE UNIT> <COMMAND PROGRAM HEADER> <QUERY PROGRAM HEADER> <PROGRAM HEADER SEPARATOR> <PROGRAM DATA SEPARATOR> <PROGRAM DATA> <DECIMAL NUMERIC PROGRAM DATA> <CHARACTER PROGRAM DATA>
7	Buffer size limitations for block data	not implemented
8	<PROGRAM DATA> elements that may appear within an expression	none
9	Response syntax for queries	see command table
10	Description of device to device message transfer traffic that does not follow the rules for <RESPONSE MESSAGES>	none
11	Size of block data responses	none
12	Common commands and queries that are implemented	*IDN?, *RST, *OPC, *OPC?, *CLS, *SRE, *SRE?, *ESE, *ESE?, *STB, *TST?, *WAI
13	State of the 8310 following completion of the CAL? Query	not implemented
14	Max length of the trigger macro block	not implemented
15	Macro parameters	not implemented (device specific forms used)
16	Response to *IDN?	<Weinschel, 8310, Serial Number, Software Revision> Manufacturer string length = 16 chars max Model Number string length = 8 chars max Serial number string length = 16 chars max Software Revision string length = 8 chars max
17	*DDT implementation	not implemented
18	Size of *RDT/*RDT? resources	not implemented
19	States affected by *RST, *LRN, *RCL, and *SAV	*RST resets the Parser, Input Buffer, and Output Queue. *LRN, *RCL, and *SAV are not implemented
20	Scope of the self test performed by the *TST?	a. checks non-volatile memory contents b. checks Device Interface Bus c. checks front-panel interface
21	Additional status data structures used in status reporting	none
22	Commands overlapped/sequential	All commands are sequential
23	Functional criteria met with an operation complete message is generated in response to that command	Command is finish executing
24	Descriptions used for infinity and Not-A-Number (NAN)	N/A

Appendix C
Internal Device Data Sheets

Click on link below to get internal device data sheet...

- 150 Series Programmable Attenuators...dc-18/26.5 GHz
- 3200 Series Programmable Attenuators...dc-2/3 GHz
- 3250 Series 75Ω Series Programmable Attenuators...dc-1.5 GHz
- 4216 & 4218 Series Solid-State Attenuators

Model 8311 (IM-303) Revision Record

REVISION	DATE	DESCRIPTION	APPLICABLE SERIAL NUMBERS
- - -	12/99	Preliminary Issue	All Units
A	1/03	Initial Issue	All Units
B	2/04	Incorporate company name change from MCE/Weinschel to Aeroflex / Weinschel, Aeroflex / Weinschel ECNs 04-026 & 04-032. Added Model 8311-137-6-R.	All built after 2-04.
C	12/05	Added Model 8311-352-9-T.	8311-352-9-T
D	3/06	Added Model 8311-204-6-R.	8311-204-6-R
E	7/06	Added Model 8311-352-6-F.	8311-352-6-F
F	2/08	On page # 9 is the specification table, it is stated 3.25 dB max. for the 8311-202-XF updated to 5.25 per ICD 089-3574.	8311-202-2F & 8311-202-3F
G	7/08	Added Model 8311-352-3-R and incorporated Aeroflex / Weinschel ECNs 07-293, 08-087.	8311-352-3-R 8311-352-6-F
H	10/08	Incorporated Aeroflex / Weinschel ECN 08-088	8311-352-9-T
I	6/09	Added Model 8311-1-6-R, Aeroflex / Weinschel ECNs 09-160 & ERN 09-113	8311-1-6-R
K	2-10	Added Model 8311-352-4-R, Aeroflex / Weinschel ERN 10-024	8311-352-4-R
L	7-10	Incorporated Aeroflex / Weinschel ECN 10-101	8311-352-4-R
M	9-27-10	Incorporated Aeroflex / Weinschel ECN 10-251	Units with Type N connectors.